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NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
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UNITED STATES DEPARTMENT OF COMMERCE

Maurice H. Stans, *Secretary*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL MARINE FISHERIES SERVICE

Philip M. Roedel, *Director*

0.38 (0.5) CYCLIC ADENOSINE MONOPHOSPHATE IN BACTERIA

Pastan, Ira (Molecular Biology Section, Endocrinology Branch, National Cancer Institute, National Institutes of Health, Bethesda, Maryland 20014); and Robert Perlman (National Institutes of Health, Bethesda, Md. 20014)
Science 169, No. 3943, 339-344 (July 24, 1970)

Cyclic adenosine monophosphate (AMP) and a specific inducer acting in concert are required for the synthesis of many inducible enzymes in Escherichia coli. Only a small amount of enzyme is made in the absence of either. Cyclic AMP controls the synthesis of many proteins. Glucose and certain other carbohydrates decrease the differential rate of synthesis of inducible enzymes (the rate of synthesis of the enzyme divided by the rate of synthesis of total protein) by lowering the concentrations of cyclic AMP.
[2 figures, 6 tables, 57 references]

0.5 (3.4) DETECTION OF CLOSTRIDIUM BOTULINUM AND ITS TOXIN IN FOOD. I. DETECTION OF CLOSTRIDIUM BOTULINUM TYPE E IN SMOKED FISH

Kautter, Donald A., and Timothy Lilly, Jr. (Division of Microbiology, U.S. Food and Drug Administration, Washington, D.C. 20204)
Journal of the Association of Official Analytical Chemists 53, No. 4, 710-712 (July 1970)

An earlier (1968) Associate Referee report demonstrated that incorporating 1 mg. filter-sterilized trypsin/ml. into an enrichment medium (5% trypticase, 0.5% peptone, 2% yeast extract, 0.4% dextrose, and 0.1% sodium thioglycolate) improved the detection of Clostridium botulinum type E. This method was tested using smoked whitefish chubs and other kinds of smoked fish inoculated with small numbers of spores of C. botulinum types A, B, and E.

A greater number of positives were obtained for all smoked fish samples inoculated with type E spores in the trypsin-containing medium than in the medium without trypsin. Also, when trypsin-containing enrichment medium is used at 26° C. and incubated for 5 days, proteolytic C. botulinum types A and B can be detected. The authors, therefore, recommend a collaborative study.
[3 tables, 1 references]

0.38 SPECIFICITIES OF TRANSPORT SYSTEMS AND ENZYMES

Berlin, Richard D. (Harvard Medical School, Boston, Massachusetts)
Science 168, No. 3939, 1539-1545 (June 26, 1970)

The mammalian cell may be considered as a solution of enzymes surrounded by a membrane. Extracellular substances must penetrate the membrane before they can be metabolized by the intracellular enzymes. This penetration is achieved by "membrane carriers"--proteins whose function is to facilitate the movement of small molecules across the membrane. Enzymes and carriers are highly specific chemically and, in order to transport suitable substrates to the enzymes, the specificity of the carriers should be nearly the same as the enzymes.

The author shows that the specificities of the carrier and the enzyme which act on the same compound are distinctly different--they are both overlapping and complimentary. An exogenous substance must satisfy two sets of requirements sequentially if it is to be assimilated into the cell or before it may inhibit the assimilation of other compounds. The first set of requirements is the carrier's as the substance penetrates the membrane; the second set is the enzyme's. This double screening constitutes an effective specificity of greater exactness than that of the carrier or of the enzyme acting separately. Also, one characteristic of the specificity for transport is a requirement for precisely that part of the substrate immediately adjacent to and including the functional group that will subsequently undergo enzymatic attack (its "reactive site"). This interaction of the carrier protein with the reactive site limits transport to molecules capable of

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0.5 (2.3) SURVIVAL OF VIRUS IN CHILLED, FROZEN, AND PROCESSED OYSTERS

DiGirolamo, R., J. Liston, and J. R. Matches (Institute for Food Science and Technology, College of Fisheries, University of Washington, Seattle 98105)
Applied Microbiology 20, No. 1, 58-63 (July 1970)

Earlier work has established that certain viruses can survive in the sea long enough to be taken up by shellfish. Certain bivalve mollusks, which had been exposed to sewage-polluted waters, have been implicated as transmitting agents for the disease infectious hepatitis. The major site of accumulation of viruses in bivalve mollusks is in the digestive tract. Little information is available, however, on the survival of viruses in mollusks when the shellfish are frozen or cooked. The purpose of this study was to determine the survival of viruses in chilled and frozen oysters and in oysters cooked by stewing, frying, steaming, and baking. The Pacific oyster (Crassostrea gigas) and the Olympia oyster (Ostrea lurida) were used. Attenuated poliovirus Lsc-2ab was used in all tests. (The virus is representative of the enteric viruses and has been commonly used in studies dealing with the uptake of viruses in shellfish.)

In the tests to determine the survival of the virus in chilled oysters, samples of whole Olympia oysters were exposed to the attenuated virus for 48 hr., dipped in dilute hypochlorite solution to disinfect the shell surface, washed, packed in sealed polymylar pouches, then stored at 5° C. for 30 days. The oysters were assayed for virus content after periodic intervals of storage. In the tests to determine survival of the virus in frozen oysters, shucked Pacific oysters were inoculated directly in the gut region with an inoculum containing 10^4-plaque-forming units of the poliovirus. The samples were stored at -17.5° C. and assayed

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0.5 HALOPHILIC BACTERIA

Kushner, Donn J. (Dep. Biol., Univ. Ottawa, Ont., Canada)
Chemical Abstracts 72, No. 21, 108019p (May 25, 1970)

0.5 DETECTION AND INCIDENCE OF ESCHERICHIA COLI (2.3) ON STORAGE PEN SURFACES OF FISHING TRAWLERS

Rosen, A., and R. E. Levin (Department of Food Science and Technology, University of Massachusetts, Amherst 01002)
Applied Microbiology 20, No. 1, 103-106 (July 1970)

The purpose of this study was to examine six bacteriological methods for the detection and enumeration of Escherichia coli on the storage pen surfaces of commercial trawlers and in the harbor water.

E. coli were found in the harbor water but were detected only in small numbers, or were not detected, on the surfaces of storage pens in the commercial fishing trawlers. Violet Red Bile agar was not effective as a selective medium for the direct enumeration of coliforms because of the nonselective development of large numbers of other gram-negative organisms. The authors recommend use of E. coli broth at 44.5° C. For the primary determination of most probable number followed by confirmation of E. coli on Levine Eosine Methylene Blue Agar. They suggest further that the term coliform has no significance in the fishing industry because many gram-negative organisms give rise to false-positive presumptive tubes of Lauryl Tryptose Broth and Brilliant Green Lactose Bile Broth and mimic coliforms on Violet Red Bile Agar. FTP

[1 figure, 2 tables, 5 references]

0.34 ELECTRICAL CONDUCTIVITY OF SOLUTIONS OF SLIME OF SOME SPECIES OF FRESHWATER FISH

Khotinskaya, V. D., and O. L. Alekseev (U.S.S.R.)
Chemical Abstracts 72, No. 17, 87523f (April 27, 1970)

0.36 (8.8) POSTMORTEM BREAKDOWN OF TRIMETHYLAMINE OXIDE IN FISH AND MARINE INVERTEBRATES

Yamada, Kinjiro (Shimonoseki Univ. Fish., Shimonoseki, Japan)
Chemical Abstracts 72, No. 7, 29211s (February 16, 1970)

0.3 (7.1) STABLE CARBONIUM IONS IN SOLUTION

Olah, George A. (Case Western Reserve University, Cleveland, Ohio)
Science 168, No. 3937, 1298-1311 (June 12, 1970)

This is a brief review of the new field of carbonium ion (reactive organic intermediate) chemistry. Recent developments (attributed to the application of new superacidic solvent systems and nuclear magnetic resonance spectroscopy) have made a continuously increasing number of carbonium ions available for direct observation and study. The application of this field to the studies of natural products is just opening up. FTP

[2 figures, 175 references]

0.5 BACTERIAL SPORE OUTGROWTH: ITS REGULATION

Hansen, J. N., G. Spiegelman, and H. O. Halvorson (Department of Bacteriology, University of Wisconsin, Madison)
Science 168, No. 3937, 1291-1298 (June 12, 1970)

Germination of a bacterial spore in a suitable medium leads to a developmental process (outgrowth) that is characterized (at least in its early stages) by specific patterns of protein and enzyme synthesis. This paper is a discussion of the biochemical reactions of metabolic events that occur during bacterial spore outgrowth. [10 figures, 3 tables, 60 references] FTP

0.38 HORSESHOE CRAB LACTATE DEHYDROGENASES: EVIDENCE FOR DIMERIC STRUCTURE

Selander, Robert K., and Suh Y. Yang (Department of Zoology, University of Texas, Austin 78712)
Science 169, No. 3941, 179-181 (July 10, 1970)

Long and Kaplan (1968) stated that the lactate dehydrogenase (LDH) of horseshore crab (Limulus polyphemus) is different from that of vertebrates in that (1) it is specific for D-lactate rather than L-lactate, (2) it has a molecular weight of 65,000 rather than 140,000 to 150,000, and (3) it occurs in six molecular forms (rather than in five) that differ in electrophoretic mobility on starch gels. However, Massaro (1970) claimed that the LDH of the horseshoe crab has a molecular weight of 140,000 and occurs in five isozymic forms. Also, he suggested that the D-LDH molecule (like the L-LDH molecule of the vertebrates) is a tetramer of two physicochemically distinct subunits that are probably encoded by two genetic loci.

The present authors confirm the report that D-LDH of the horseshoe crab occurs in six isozymic forms electrophoretically patterned on starch gels in two triads. Also, they suggest that the three more anodally migrating isozymes are dimer molecules; the polypeptide subunits of these dimers are encoded by two genetic loci and are not involved in the formation of the lower triad of isozymes. [2 figures, 11 references] FTP

0.5 for virus at periodic intervals of storage up to 12 weeks. For the determination of survival of the virus in cooked oysters, shucked Pacific oysters were inoculated with 0.5 ml. of the poliovirus suspension containing 10^{14} plaque-forming units of virus per ml. The oysters were then stewed, fried, baked, or steamed by standard cookbook methods.

The results showed that poliovirus can survive in chilled oysters for a period of 30 days (the oysters were badly decomposed after this period of storage) and in frozen oysters for 12 weeks (the survival rate ranged from 10 to 13%). The virus also withstood the cooking methods used (stewing, frying, baking, and steaming). Apparently, the penetration of heat into the oyster when cooked by these methods was not sufficient to inactivate the virus.

The authors suggest that chilled, frozen, and cooked oysters can serve as vectors for the transmission of virus disease if the shellfish are harvested from a polluted area.

[3 figures, 6 tables, 20 references]

0.38 undergoing attack by the intracellular enzymes, and at the same time prevents the attack during translocation of the substances through the membrane.

[4 figures, 4 tables, 36 references]

0.6 IFT REPORT, PART 1: RALPH NADER, MAGNUS PYKE, ETHICS AND RESEARCH

Anonymous
Canner/Packer 139, No. 7, 24-25 (July 1970)

This article is the first of two summarizing the material presented at the 1970 convention of the Institute of Food Technologists. In the keynote address, Dr. Magnus Pyke, president of the British Institute of Food Science and Technology, emphasized the technologist's dual function: to discover scientific fact and to balance a degree of risk against a measurable degree of pleasure in adding to man's level of happiness. Among the 175-odd research papers presented at the technical sessions were those given by the following:

R. M. Wangen, Department of Poultry Science, Iowa State University, Ames 50010. (A recently perfected, rapid, dye-binding method for determining the protein content of meat and eggs is useful for controlling the composition of ground meats, liver, eggs, and prepared mixes.)

G. W. Shults, U.S. Army Natick Laboratories, Natick, Mass. 01760. (All but one of various phosphates tested with and without salt on meat increased the pH and the swelling capacity of the meat. Pyrophosphate had the most pronounced effect. Adding salt increased swelling but slightly decreased pH. Adding 4 or 5% salt with any of the phosphates tested brought the water-holding capacity of the meats to the maximum.)

J. H. Strasser, FMC Corporation, Central Engineering Laboratories, Box 580, Santa Clara, Calif. 95052. (Vacuum packaging, rapid immersion freezing, and

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0.6 COMMERCIAL DEVELOPMENT OF INTERMEDIATE MOISTURE FOODS

Kaplow, Milton (Technical Center, General Foods Corporation, White Plains, New York)
Food Technology 24, No. 8, 53-57 (August 1970)

An intermediate moisture food is one that is moist enough to be eaten as is (without rehydration) and is "dry" enough to be shelf stable without refrigeration or thermal processing. The most significant commercial development of intermediate moisture foods has been pet food. Now, as the fundamental principles involved in their production become better understood and applied, interest has developed in intermediate foods for human consumption. The basic principle involved is to reduce the water activity a_w (a measure of the effective concentration of water in the substance) to a level where growth of microorganisms does not occur.

In a typical soft moist dog food, for example, meat byproducts and soy flakes are the major sources of protein. The moisture content of the final product is about 25% and is sufficient to hydrate the vegetable protein source and other non-water soluble solids in the mix. The moisture, animal fat, and emulsifier impart plasticity to the product. Sugar is added to lower the water activity (a_w) of the dog food. Potassium sorbate is added to inhibit growth of molds and yeasts.

In the preparation of intermediate moisture foods for human consumption, two methods were devised for infusing pieces of food, water, and additives whereby the flavor, texture, and appearance of the natural food were retained. In the first method, vacuum-dried or freeze-dried foods are used. The dried foods are soaked in an infusion solution to a point where the food pieces, after draining, have the proper moisture content and water activity.

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0.6 DEVELOPMENT OF INTERMEDIATE MOISTURE FOODS FOR MILITARY USE

Brockmann, Maxwell C. (Animal Products Division, Food Laboratory, U.S. Army Natick Laboratories, Natick, Massachusetts 01760)
Food Technology 24, No. 8, 60-64 (August 1970)

Intermediate moisture foods (IMF) offer several potential advantages for use in certain military rations: (1) They have a low moisture content (therefore, they can be concentrated relative to weight, volume, and caloric content), (2) they are suitable for direct consumption, (3) their texture and consistency are closer to the normal food than that of dried foods, and (4) the wholesomeness of an IMF is not as dependent upon the integrity of the containers as is that of other forms of foods. Currently available IMFs, however, are yet unsuitable for military needs.

Information now available indicates that a great variety of foods in the IMF range can be prepared by equilibrating (and cooking) the food in an aqueous solution of glycerol, salt, and antimycotic. The resulting IMF should have the desired a_w (the ratio of the vapor pressure of water in the food to the vapor pressure of pure water at the same temperature) and concentration of antimycotic. Such techniques have been applied to meats and fish (beef, pork, chicken, lamb, ham, tuna) and to certain vegetables and food products (peas, carrots, mushrooms, onions, potatoes, pineapple, celery, macaroni, and egg noodles). The following table gives the composition of equilibrium solutions for various foods.

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1.22 (1.0140) THE HERRING OF THE NORTH ATLANTIC BASIN AND ADJACENT SEAS AND THE STATE OF ITS DISTRIBUTION

Maslov, N. A.
Translated by the Bureau of Commercial Fisheries, Washington, D.C., Office of Foreign Fisheries, 205 pp. (1970)
Polyarnyi Nauchno-Issledovatelskii Institut Morskogo Rybnogo Khozyaistva i Okeanografii Trudy, U.S.S.R. 17, pp. 5-111, 147-191, 249-262,287-301 (1966)
U.S. Government Research & Development Reports 70, No. 14, 73 (July 25, 1970)
Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. PB-191 756T. Price $3.00.

Contents: Conditions and basic regularities in the feeding of the Atlanto-Scandian herring (Clupea harengus harengus L.) in the Norwegian Sea (1951-1962); Hydrological conditions in the Norwegian Sea in the period of summer feeding of herring from 1958 to 1963; On the problem of the formation of the commercial stock of Atlanto-Scandian herring; On the population of Atlanto-Scandian herring of the 1950 and 1951 year-classes with slow growth rate; Peculiarities of the 1950 and 1951 year-classes recruitment to the spawning stock of Atlanto-Scandian herring; Biological characteristics and fecundity of spring spawning herring (Clupea harengus harengus L.) in the Norwegian Sea; Fecundity and efficiency of spawning of Atlantic herrings in the Gulf of Maine; The problem of long-term fluctuations of surface-water temperatures in the North Atlantic Ocean; Age and growth studies of Atlantic herring (Clupea harengus harengus L.) of the Georges and Bankero Banks during the years 1959-1962.

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Product to be equilibrated	Components of the equilibrium solution					
	Glycerol	Water	Sodium chloride	Sucrose	Potassium sorbate	Sodium benzoate
	%	%	%	%	%	%
Tuna	53.6	38.6	7.1	--	0.7	--
Carrots	59.2	34.7	5.5	--	0.6	--
Macaroni	42.7	48.8	8.0	--	0.5	--
Pork	45.6	43.2	10.5	--	0.7	--
Pineapple	55.0	21.5	--	23.0	0.5	--
Celery	68.4	25.2	5.9	--	0.5	--
Beef	87.9	--	10.1	--	--	2.0

[1 figure, 4 tables, 19 references]

2.06 FISH PROTEIN PRODUCT

Japanese Patent 3185/70
Taiyo Fishery Co. Ltd. (pat.)
Food Technology 24, No. 8, 65 (August 1970)

An undenatured fish protein product is prepared by bleaching finely-divided fish in water, adding amino acids and sugars, and freezing. FTP

2.06 FISH PASTE PRODUCT

Japanese Patent 3186/70
Nippon Vitamin Yu Kogyo Co. Ltd. (pat.)
Food Technology 24, No. 8, 65 (August 1970)

The product consists of cooked fish paste combined with fatty acid glycerides. FTP

2.03 CHRONOPOTENTIOMETRIC STUDY OF FORMALDEHYDE IN FISH FLESH

Bilino, Luciano (Fac. Econ. Commer., Univ. Genova, Genoa, Italy)
Chemical Abstracts 72, No. 25, 131216j (June 22, 1970)

0.6 FÖRTECKNING ÖVER SIK:S SKRIFTER 1948-30.6 1969
[LIST OF SIK (SVENSKA INSTITUTET FOR KONSERVERINGSFORSKNING) PUBLICATIONS, 1948 - 1969]

Anonymous
Swedish Institute for Food Preservation Research, SIK Report No. 132a, 33 pp. (1969)
(In Swedish) (Göteborg, Sweden)

The subject publications are listed chronologically, by author, and by subject. Many are in English. A price list accompanies the report. LB

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storage below 0° F. are the best means of preserving crab meat. (Vacuum packaging can be omitted if storage below 0° is assured.) The author's firm is developing equipment that combines the pouch-filling, cooking, vacuum-sealing-understeam, and Freon-immersion processes.)

C. R. Rey, Department of Food Technology, Iowa State University. (Initial loads of bacteria affect the spoilage of poultry during cold storage; frozen storage increases the spoilage organisms whereas vacuum packaging with air-impermeable films reduces bacterial counts.)

S. J. Bishov, Food Chemistry Division, U.S. Army Natick Laboratories. (Removing oxygen from the head space of freeze-dried foods significantly improves quality. Using 5% hydrogen in nitrogen, with a palladium catalyst, gives best results.)

D. E. Westcott, U.S. Army Natick Laboratories. (A prototype system for continuous microwave sterilization of pouches containing thermostabilized wet meat products is feasible for military rations. Butterfly valves form the needed airlock; immediate overpacking provides storage stability. No costs were given.)

A. N. Laubscher, Applied Research Laboratory, U.S. Steel Corporation, 125 Jamison Lane, Monroeville, Pa. 15146. (A new, continuously cast steel (RIBAND 1) is of uniform chemical composition and has a sounder surface than do steels now used for tinplate cans. It meets all food-container requirements.)

A. Kramer, Department of Horticulture, University of Maryland, College Park 20742. (For greatest quality control and least movement of soluble solids downward within products being slowly frozen, application of cold from above should be avoided, comminution minimized, and freezing rate increased.)

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In the second method, normal moisture foods--raw or cooked--are used. The food is soaked in an equilibrium solution to a point where the food pieces, after draining, have a water content and water activity at levels where the food is edible without further rehydration. The formula of the equilibrium solution and the processing treatment are based on the assumption that the additives will diffuse into the food so that their final concentration in the food and in the solution will be similar. Infusion formula for dried carrots is given as glycerol, 54.4%; water, 42.0%; sodium chloride, 2.2%; propylene glycol, 1.1%, and potassium sorbate, 0.3%. [9 figures]

0.7 NUTRITIONAL IMPROVEMENT AND WORLD HEALTH POTENTIAL (0.6)

Stare, Fredrick J. (Department of Nutrition, Harvard School of Public Health, Boston, Massachusetts)
Journal of the American Dietetic Association 57, No. 2, 107-110 (August 1970)

Three major steps must be taken to deal with the world food situation: (1) control size of the population, (2) increase food supplies, and (3) improve the quality of protein in the diet.

The author predicts that achievement of nutritional improvement of our world population must include: (1) improvement of the nutritional quality of the common cereals by fortification with synthetic amino acids, (2) improvement in the yields of cereals by genetic change and fertilization, and (3) improvement of the quality and quantity of the protein by use of mixtures of cereals and by fortification of cereals with fish protein concentrate. [1 reference] FTP

2.1128 LOBSTER TRAP TESTS REVEAL NEED FOR CHEAP, LONG-LASTING MATERIAL

Spurling, Ted
National Fisherman 51, No. 5, 5C, 22C (September 1970)

Increasing numbers of sea urchins in most lobstering areas have made use of traditional wood-and-nylon-netting traps impractical. In an effort to find a material that would make lobster traps light, strong, durable, easy to handle, economical and simple to build, and relatively free of maintenance problems, the author tested several different kinds of traps. In order of their fishing ability, the three best were:

1. Conventionally styled plastic traps. Everything in these traps except the heavy galvanized-nail fastenings is pure plastic. Those that were large enough to leave plenty of room around the bait caught just as many lobsters as wooden traps do. However, plastic lath, bow, and yoke material is very expensive, making the traps (not counting ballast) cost about $25 each.
2. Tedruth molded-plastic box traps. The author thinks these are the most practical and economical of the plastic traps. They are large but very light, and their design permits the fisherman to put in his own head device or to convert from end doors to side doors.
3. Standard bowed traps made of 36-in. aluminized steel. These traps are fairly strong, economical to build, and durable against sea urchins. Square traps made of plastic-coated wire also fish well, but they last only as long as the plastic coating lasts. Although cohasset iron traps are cleverly designed and built, the bottoms and hinges rust out fairly rapidly. These traps,

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2.117 GDR FLOTILLA FISHING

Anonymous
World Fishing 19, No. 2, 18-20 (February 1970)

The flotilla fishing fleet of the German Democratic Republic comprises 2 transport-processing vessels, 2 catching-processing vessels, and 21 stern trawlers. The trawlers represent a complete innovation in fishing vessel design. The original requirements were an extensive radius of action, a minimum number of crew members, and high overall performance combined with ease of maintenance and repair. During the 2 years since construction of the trawler series began, the design has been refined and improved enough to increase the average daily catch by 12%--to 24.5 tons a day. The features of these vessels are given, including the techniques and devices that keep fish handling to a minimum. The computerized data-collection and -processing system is mentioned whereby catch rates and other information are fed by the trawlers through the transport-processing vessel to a mother ship and then to the fleet operator at Rostock, base of the VEB Fischkombinat. [10 figures]

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2.113 BARNACLE CEMENT--KEY TO SECOND GENERATION ANTIFOULING COATINGS

Saroyan, John R., Elek Lindner, Carol A. Dooley, and Henry R. Bleile (Mare Island Naval Shipyard, U.S. Navy, Vallejo, California)
Product Research & Development 9, No. 2, 123-133 (June 1970)

Marine fouling is responsible for many destructive effects: Those that cause loss of speed of ships and overconsumption of fuel, promote corrosion, render moving parts of equipment inoperative, and increase the weight of buoys and navigational equipment. Presently available antifouling (first generation) coatings protect ship bottoms for periods up to 3 years. A new approach is needed that will result in the development of "second generation" antifouling coatings that are effective for extended periods even up to 10 years. Development of such coatings must be based on an understanding of the biology, chemistry, and physics of the attachment mechanism and adhesion secretion of the fouling organisms, including the adhesion and hardening mechanism of such secretions. To obtain such information, the researchers are studying the attachment mechanism of barnacles, an important fouling organism.

The first generation antifouling coatings, containing toxic chemicals, were developed empirically and the effect of the chemicals in preventing fouling is not thoroughly understood. The toxic chemicals (for example, mercuric oxide, cuprous oxide, tributyltin oxide, triphenyllead acetate) slowly leach into the sea water, creating a toxic environment near the coating. Although the leaching rate of the toxics can be regulated by the character of the matrix, the effective

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2.141 (1.122)(1.017) SEA TEMPERATURE MAPS AID TUNA FISHERMEN

Anonymous
World Fishing 19, No. 5, 51-52 (May 1970)

Southern bluefin tuna are most likely to be found in areas where the surface temperature of the water is in the range of 16.7° to 20° C. and fronts exist. Fishermen locate these fronts either by watching for the water color change that characterizes them or by watching the trace on a thermograph. Until recently maps assisting in the location of tuna were prepared from observations made on board surface vessels, a slow and costly process. For the past few years, however, these maps have been prepared from data gathered by an airplane equipped with an infrared radiation thermometer. The results have been an estimated 20% saving in steaming time and from 10 to 30% increase in catch. During the 1968 season, Australian fishermen caught a record 4,000 short tons of tuna.

The thermometer used for measuring sea-surface temperatures works on the principle that, within a certain range of wavelengths, the amount of infrared radiation emitted by an object is proportional to its surface temperature. It internally compares the radiation emitted by a given target object with that generated by a body of known temperature and so determines the surface temperature of the object at which it is aimed. The target object can be at any distance as long as it fills the field of the viewer. The thermometer's response time is a fraction of a second. [2 figures]

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lifetime of the first generation coating is limited by the concentration of the chemical in the coating and the leaching rate.

Barnacles initially use a mechanical type of attachment and subsequently secrete a cement. The cement is a polymer consisting mainly of proteinaceous material. The workers are investigating the cement-hardening mechanism using electron permagnetic resonance spectroscopy and autoradiography. Further development work on antifouling coatings is continuing, several approaches being used: (1) prevent initial attachment of the foulant by use of highly specific toxics, (2) discourage attachment by use of repellents that disguise the surface settling site or that interfere with the hardening mechanism, (3) prevent or reduce the adhesion of the cement by use of nonsoluble surfaces with free energy values.
[16 figures, 6 tables, 37 references]

2.3 (3.27) MICROWAVE HEATING

German Pending Patent Application 1,440,532
Neff, Alfred (pat.)
Food Technology 24, No. 8, 72 (August 1970)

Foods are heated or thawed on a moving belt by microwave energy. FTP

2.3 (1.85) SHRIMP COOKING

U.S. Patent 3,502,317
Veltman, P. L.; W. R. Grace & Co. (pat.)
Food Technology 24, No. 8, 65 (August 1970)

Shrimp are cooked with steam under pressure, then cooled with water under pressure and below 125° F. FTP

2.3 TENDERIZING APPARATUS

U.S. Patent 3,492,688
Godfrey, C. S.; Physics International Co. (pat.)
Food Technology 24, No. 8, 70 (August 1970)

A piece of food is tenderized by placing it in water and detonating an explosive charge. FTP

2.117 PURPOSE-BUILT COCKLE DREDGER

Anonymous
World Fishing 19, No. 5, 26-27 (May 1970)

In early 1967, the British White Fish Authority introduced an 18-in., hydraulic-lift cockle dredge that can gather economically worthwhile quantities of cockles on grounds that are too sparsely populated for hand raking or that are inaccessible to conventional harvesting due to their location beyond the low-water line. [See World Fishing 16, No. 7 (July 1967) for a description of the dredge.] The dredge can operate in waters as deep as 12 ft. On grounds where cockles are as dense as 40 to the square foot, it will harvest 3 tons an hour; on heavily populated grounds, it will bring up many times this amount. Because of this high productivity, certain regulating authorities who fear its use will result in overfishing have delayed wide adoption of the dredge. Nevertheless, a British fishing company has had a 45-ft. cockle dredger designed and built expressly to operate the WFA equipment.

Presently the dredger is fitted with a single dredge and a single auxiliary engine and pump. For trim, the dredge is placed to starboard and the auxiliary engine to port. When a second dredge is installed, as is planned, it will be set to port and its driving engine will be fitted on the starboard side. Lack of headroom makes use of one large auxiliary engine to power both dredges impractical. The specifications for the vessel call for a shell crusher, suggesting that the cockles will be cooked and the meat extracted on board. The vessel is described in detail. [2 figures] LB

2.1125 PACIFIC SEINERS CUT LABOUR COSTS WITH POWER NET DRUM

Slack, E. B.
World Fishing 19, No. 2, 26-27 (February 1970)

With a net drum, four or five men can handle a net having a 280-fathom headline and a 30-fathom depth. With a turntable and power block, seven or eight men are required for the same net.

This article describes the slight modifications in the net that must be made when a seiner is converted from power-block to drum seining, the use of an auxiliary power dory or skiff during the setting and pursing operation, and the techniques used for catching different kinds of fish.
[3 photographs] LB

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along with the Leakey folding trap (which would not stay intact very long in areas infested with sea urchins) and the Canadian Plastic Igloo Trap (which is of poor design and size), were the poorest producers. [4 photographs]

1.82 (1.0116) THE ATLANTIC SURF CLAM FISHERY (1968)

Yancey, Robert M. (Bureau of Commercial Fisheries Biological Laboratory, Oxford, Maryland 21654)
Commercial Fisheries Review 32, Nos. 8-9, 40-46 (August-September 1970)

The author briefly reviews the Atlantic Surf Clam fishery during 1968 from the standpoint of fishing areas, fleets and methods, landings statistics, and status and trends of the fishery.
[4 figures, 1 illustration, 1 table, 3 references] FTP

2.146 FISH FINDING WITH SONAR. PART SIX--REVERBERATION; SURFACE, WAVE, WRECK AND TEMPERATURE ECHOES

Anonymous
World Fishing 19, No. 5, 30-31 (May 1970)

This article describes reverberation and five kinds of echo; each is illustrated by sample traces.

Reverberation, or background noise, is the shuffling sound heard after each pulse transmission. It is caused by the transmitted sound's being reflected by such particles as plankton or air bubbles. In deep water, the greater the distance over which it is recorded, the more extensive is the sonar's range. In shallow water, however, it can be confused with the sound from a refracted transmission (primary) beam; thus it cannot be used effectively to find fish in fjords or inshore waters whose depth is less than 300 ft. On the other hand, it can be used with effect to locate scattered fish that the depth sounder has picked up. In such cases, the reverberation controlled gain position should be used to pick up the fish echoes from the reverberation "carpet."

Sharply distinct vertical or horizontal temperature layers in the sea produce stratal echoes that often vary widely with distance. These echoes, along with those caused by the roll of the vessel, often make it difficult to keep in contact with a shoal of fish at ranges of more than 300 meters.

Surface echoes appear at ranges of up to a few hundred meters all around the horizon. They vary with the season, being weakest in summer and strongest

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2.9 (3.4)(3.29) THE POSSIBLE NITROSATION OF AMINES IN SMOKED CHUB

Malins, Donald C., William T. Roubal, and Paul A. Robisch (Bureau of Commercial Fisheries Pioneer Research Laboratory, 2725 Montlake Boulevard East, Seattle, Washington 98102)
Journal of Agricultural and Food Chemistry 18, No. 4, 740-741 (July-August 1970)

This paper reports on a study of the formation of dimethylnitrosamine (DMNA) in aqueous model systems containing methyl amines (trimethylamine, trimethylamine oxide, and dimethylamine) and sodium nitrite. The experimental conditions (pH, reaction time, temperature) used were more favorable to the reaction than those conditions that occur during commercial smoke processing of chubs. In these systems the concentration of $NaNO_2$ (400 p.p.m.) and the reaction time (2.5 hr.) were kept constant. Trimethylamine concentration varied from 100 to 2,000 p.p.m.; trimethylamine oxide, from 800 to 2,000 p.p.m.; and dimethylamine, from 800 to 2,000 p.p.m. The test reactions were carried out at 80° and 100° C. The solutions were buffered at pH 5.8 and 6.4.

DMNA was not detected in any of the model reaction systems conducted at 80° C. The lower limit of detection of DMNA by polarographic analysis was 1 µg. (1.4×10^{-8} mole). Approximately 1 µg. of DMNA was detected at a trimethylamine concentration of 400 p.p.m. at pH of 6.4 and reaction temperature of 100° C. Under the same conditions but at pH of 5.8 about 8.5 µg. of DMNA was formed. Apparently a slight increase in acidity may result in a significant increase in the production

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2.147 (1.12) N. ZEALAND EXPLORES A TUNA CATCH TECHNIQUE

Avery, Max
World Fishing 19, No. 2, 28-29 (February 1970)

When schools of tuna follow known migration paths near the land, as they do in New Zealand and Australian waters, they can be caught by small vessels that do not have the range and freezing equipment that the big tuna clippers and long-liners have. To help fishermen spot and fish tuna efficiently, the New Zealand Marine Department, in collaboration with the New Zealand fishing industry, has launched a research program in which acoustic lures are used.

Experience with hydrophones made the director of the program realize that the sounds made by tuna and the associated conflux of seabirds, porpoises, dolphins, and feed fish could give a clue not only to where the tuna were but when they were feeding. Therefore he set sono buoys about 30 ft. below the surface and tuned them to receive signals in the frequency range of the sounds emitted by dolphins. The signals were transmitted from the buoys to a recording unit. The theory was that a replay of the sounds made by food fish being attacked by feeding tuna or dolphins would attract scattered tuna and make them easier to catch. Once the tuna have been concentrated, the skipjack can be taken easily by gill net while the albacore can be taken by chumming and the use of artificial lures. The advantage of such a fishing technique is that smaller boats can be used and that rock lobster fishermen can fish for tuna during their off season--from December to April, when the tuna are migrating up the east coast of Australia and New Zealand.

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2.9 (9.19) MERCURY IN FRESHWATER FISH

Bligh, E. G. (Fisheries Research Board of Canada Freshwater Institute, Winnipeg)
Fisheries of Canada 22, No. 10, 7-8 (May-June 1970)

Mercury, an unusually heavy liquid metal, is widespread in nature. It and its chemical compounds are noted for their poisonous properties. Nevertheless, it has many uses--in thermometers, silent electrical switches, dental preparations, fluorescent lights, batteries, mildew-proof paints, ointments for treating skin diseases, seed dressings and other agricultural fungicides, and electrical instruments. It is used in the manufacture of paper, plastics, felt, and mirrors; in the extraction of gold and silver from ores; and in the pulp and paper industry to control slime in the wood-preparation areas and around the paper machines. (Over the past 10 years, many paper mills have quit using organic mercury compounds to control slime owing to regulations prohibiting the use of mercury-containing materials for food packaging.)

But by far the biggest users of mercury in Canada and the United States are chlorine plants. Of the 300,000 lb. of mercury used in Canada in 1969, 200,000 lb. of it was used by these plants. Those that use mercury may lose up to one-third of a pound of mercury for every ton of chlorine produced. Thus a plant that produces 100 tons of chlorine a day would lose about 10,000 lb. of mercury a year, most of which, until recently, being discharged with waste water into nearby rivers and lakes.

When mercury is discharged into a river or lake, much of it goes to the

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2.147

The research program has been divided into three parts. During phase one, all signals associated with the presence of tuna (various dolphin sounds, the thrashing and fear noises of bait fish under attack, the sudden increase of tuna swimming vibrations when they begin to chase the bait fish, the noise of seabirds when they form a feeding flock, the "squeak" and loud thrashing of skipjack when they become enmeshed in a gill net) will be recorded. During phase two, a broad sea front of about 20 miles will be covered with sono buoys to show the presence of schooling tuna by pinpointing the maximum signals emitted by the sources recorded during phase one. During phase three, the recorded signals will be transmitted in areas where the tuna are scattered so that schools can be formed where nets and longlines have been set.

Fishing operations during which the acoustic lure was tested have been quite successful. By putting out five or six sono buoys at intervals of 3 miles, the researchers have been able to cover an 18-mile front. By putting a buoy in the vicinity of the net, they have been able to determine whether or not the net is catching any tuna. They have also been able to locate the best fishing grounds, to determine the types of lure that give the best catches (the normal feather jig and the Japanese octopus vinyl lure), and the best trolling speeds (5-6 knots for albacore and about 8 knots for skipjack and yellowfin).
[1 photograph]

2.146

in autumn. They can be quite distinct when the ocean surface is rough.

Air bubbles left by the wake can last for up to half an hour. They produce sharp wake echoes, even preventing the sound from penetrating beyond the wake area. Wake echoes are particularly noticeable when several vessels are operating in a limited area. Vessels operating alone should take care that no wake, even from a skiff or dinghy, is left between their operating position and the target.

The traces left by wreck echoes are not easily distinguishable from those produced by other objects. However, their sound over the loudspeaker is different--a strong, sharp, dry click. Such a target is usually much more pronounced than is a shoal of fish.

Wave echoes are the result of air being beaten into the water during a rough sea. At such times, the sonar beam is reflected from the confused surface of the water, giving good echoes at long ranges. Sonar contact under these conditions can be maintained until the vessel is actually crossing over the disturbed area.
[7 figures]

2.8 A DEVICE FOR CONTROLLING THE CURLING OF A PEELED SHRIMP DURING A COOKING OPERATION

(3.3343)

British Patent 1,188,695
Hice, H. B. (U.S.A.) (pat.)
BFMIRA Abstracts 23, No. 6, Abstract No. 1329, 323 (June 1970)

A perforated tray with upward projecting guides holds the shrimps in the correct position. A second tray rests on top and restrains the shrimps, thus preventing them from curling during cooking. Reprinted

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2.8 MICROWAVE HEATING APPARATUS.

British Patent 1,194,019
Bowmar/TIC Inc. (formerly Technology Instrument Corp.) (U.S.A.) (pat.)
BFMIRA Abstracts 23, No. 8, Abstract No. 1730, 425 (August 1970)

The oven can be used either for microwave cooking or for thermal cooking of foodstuffs as it contains both cooking elements and a microwave magnetron. There are wave guide connections which couple the microwave energy to the cooking elements. The elements can act thermally or by microwave energy separately or simultaneously. The oven is open to the exterior for removal of vapours. Reprinted

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2.9 CHEMISTRY OF SOME TOXINS ISOLATED FROM MARINE ORGANISMS

Scheuer, Paul J. (Dep. of Chem., Univ. of Hawaii, Honolulu, Hawaii)
Chemical Abstracts 73, No. 1, 2072f (July 6, 1970)

2.9

bottom and stays there. However, some of it is released into the water, where it can be taken up directly by the indigenous fish. In addition, the fish will accumulate mercury in the muscle. In pike, for example, the concentration in the muscle can be 3,000 times the concentration in the water. Moreover, pike, like other predator fish, can accumulate particularly high levels of the metal, since the amount they ingest with the fish they eat is added to their normal uptake from the water. The accumulation in fish muscle can be very rapid, just a few days; the elimination is slow, the biological half-life being 70 days. For this reason, the highest concentrations of mercury are found in larger, older fish.

Among the tests being conducted by the author's agency are those to determine whether mercury interferes with fish reproduction and whether fish can be processed in some way that will remove the mercury. Up to now they have found that cooking does not alter the mercury content significantly. However, when Cedar Lake pike were processed into fish meal, the mercury loss was about 25%.
[1 photograph]

2.9

of DMNA. Detectable amounts of DMNA were not produced in the model reaction systems containing dimethylamine or trimethylamine oxide.

The authors conclude that, in all probability, concentrations of dimethylnitrosamine greater than 10 p.p.b. would not form during the commercial processing of chub. [1 table, 9 references]

2.43 CLAM PACKAGING

(1.82)

U.S. Patent 3,508,930
Bennett, R. A. (pat.)
Food Technology 24, No. 9, 96 (September 1970)

The package consists of two engaging pieces that contain one or more depressions for holding the clams in a horizontal position. FTP

3.15 (8.8) COMMERCIAL FEASIBILITY OF IRRADIATING HADDOCK AND COD FILLETS-- 1. QUALITY OF HADDOCK AS LANDED AT BOSTON, MASSACHUSETTS

Kaylor, John D., and Edward J. Murphy (Bureau of Commercial Fisheries Technological Laboratory, Emerson Avenue, Gloucester, Massachusetts 01930)
Fishery Industrial Research 6, No. 3, 139-154 (August 1970)

Successful commercial preservation of fresh fish fillets by irradiation requires that raw material of a level of quality suitable for irradiation be available. To determine the amount of haddock, Melanogrammus aeglefinus, landed in Boston by the New England offshore fleet that meet this level, we surveyed the Boston haddock fishery.

The survey was made during the winter, summer, and autumn so as to reflect the effect of temperature differences of the principal seasons, with spring and autumn being considered equivalent. Criteria for subjective measurements of freshness were developed and applied to over 4,500 individual samples of haddock. Objective measurements of temperature were made by Tele-Thermometer.

All data were fed into a computer that was programed to give correlations among the temperature measurements and the expert subjective judgments. The computer showed that subjective examinations had significant to highly significant correlations at the 1-percent level of probability, but the judgment of highly skilled fish examiners was superior to the findings of the computer in distinguishing and recording fine distinctions.

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Extracter: FTP

3.15 [RADIATION CHEMISTRY]

Phillips, Glyn O. (reviewer)
Nature 226, No. 5251, 1178-1179 (June 20, 1970)

Principles of Radiation Chemistry, by J. H. O'Donnell and D. F. Sangster. viii + 176 pp. Arnold, London, March 1970. 45s.

This book is a concise outline of the effects of radiation on chemical systems. Following a most extensive survey of literature sources, it outlines the basic modes of interaction between radiation and matter. Then it surveys experimental procedures and special techniques. The chemical effects of radiation are discussed in terms of those occurring in gaseous systems, aqueous solutions, organic compounds, and polymerization and graft copolymerization. The book has chapters on radiation damage in relation to biological systems, on hot atom chemistry and the self-decomposition of labeled molecules, and on the radiation sterilization and industrial applications that have developed along with radiation chemistry.

The reviewer says that the authors of this book have given order to a subject that has developed very unsystematically. He adds that radiation chemistry generally may well benefit more from this outline of basic principles than from the many symposia and advanced specialized treatises that have recently appeared.

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3.231 PATENT ABSTRACTS

Anonymous
Refrigeration and Air Conditioning 73, No. 866, 80 (May 1970)

Moisture Control
British Patent 1,176,579 (Owens Corning Fibreglass Corp., Toledo, Ohio) (pat.)

Due to the wide temperature differential between inside and outside air, moisture is likely to build up inside the walls of cold stores. A wall containing a vapor barrier where the flow-through temperature is used overcomes moisture build-up and provides a stable insulation structure that will not shrink, crack, or burn.

Removing Gases
British Patent 1,176,729 (Carrier Corp., Carrier Parkway, Syracuse, N.Y.)

A new purge system removes noncondensable gases from absorption refrigeration systems.

Refrigerators for Food
British Patent 1,176,986 (Giovanni Borgi, 23 Comerio, Varese, Italy) (pat.)

In most refrigeration systems, compressor, condenser, and evaporator are all fixed and interconnected in the same cabinet, making it necessary to remove them all when repairs are necessary on one. In a new design, these three elements are separate from the main cabinet, making replacement of any one of them simple.

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3.231 NEW THOUGHTS ON AN OLD SUBJECT -- COLD STORAGE INSULATION

Seward, R. M. (Globe Engineering Co., Chicago Illinois)
ASHRAE Journal 12, No. 7, 42-45 (July 1970)

The author reviews the advantages, disadvantages, and applications of four types of insulating material: corkboard, styrene foams, urethane, and prefabricated sandwich panels. Then he illustrates the annual cost of owning and operating a 34° F. cooler, a -10° F. freezer, and a wall that separates the two when they have been refrigerated with various thicknesses of insulation. In all three cases, the annual cost for 2 extra inches of insulation above the optimum is less than for 1 inch too little. However, the extra thickness should be in one layer if at all possible. When multiple layers of insulation are used, particularly when the joints between the layers are staggered, fluctuations in temperature--that is, alternate freezing and thawing--will eventually rupture the vapor barrier. Moisture formed during the freezing and thawing will penetrate the joints between the layers of insulation and between the masonry and the insulation until all that holds the insulation to the wall is ice.

The article ends with some words of advice to people who are planning the construction of insulated rooms or buildings. First of all, get the best possible vapor barrier you can on the warm side; then make sure that vapor migration into the cold side is impeded as little as possible. Thus, if the barrier is punctured, the vapor will condense on evaporators, not in the wall. To prevent rupture when the insulation shrinks as room temperature is lowered the first time, carefully install an extra tough, folded vapor barrier at the junctures of wall

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3.231 REFRIGERATION SYSTEM

British Patent 1,170,507
N. V. Philips' Gloeilampenfabrieken, Emmansingel 29, Holland (pat.)
Refrigeration and Air Conditioning 73, No. 867, 72 (June 1970)

The system uses a paramagnetic material that is alternately magnetized and demagnetized (entropy of a paramagnetic material in a magnetic field is lower than in other fields) and liquefied helium at 20 atmospheres. LB

3.231

3.231 REFRIGERATION SYSTEM

Expanding a Gas
British Patent 1,177,651 (H. Sixsmith, Engineering Science, Oxford University, Park Road, Oxford, England) (pat.)

A method has been developed for expanding the gas to be used in cryogenic refrigeration by moving a piston in the gas chamber. The gas is passed in heat-exchange relation with a heat load.

Insulating Element
British Patent 1,179,442 (Technigaz 21, Avenue George V, Paris 8, Seine, France) (pat.)

A foam, plastic-reinforced structure made in the form of a solid, composite panel or block has sufficient mechanical strength to be used alone or as a lagging material.

3.231

3.2349 NEW FREEZE-DRYING METHOD

Anonymous
Canner/Packer 139, No. 7, 30 (July 1970)

The Division of Food Preservation, CSIRO (Australia's Commonwealth Scientific and Industrial Research Organization), has developed a method for freeze-drying food products with helium gas rather than air. Using helium in the cyclic-pressure process, CSIRO reduced the time normally required for freeze-drying by 50%. The greater efficiency is probably due to the fact that helium's greater conductivity hastens the removal of heat from the product. LB

3.2349 FREEZE DRYING

British Patent 1,170,872
M. L. Brewster, 14248 Haynes Street, Van Nuys, California (pat.)
Refrigeration and Air Conditioning 73, No. 867, 72 (June 1970)

A new apparatus is claimed to prevent the infusion into a product that has been freeze dried but not packaged of the atmospheric oxygen and moisture that cause product oxidation during storage. LB

3.231

and ceiling, wall and wall, and wall and floor. (Lower the temperature that first time very slowly, taking a couple of weeks if possible.) Keep informed of new materials and processes, and don't hesitate to pressure manufacturers into developing and offering better ones. [6 figures]

3.15 COMMERCIAL FEASIBILITY OF IRRADIATING HADDOCK AND COD FILLETS -- (8.8)(2.5) 2. TEMPERATURE PATTERNS DURING SHIPMENTS OF FRESH FILLETS BY TRUCK AND BY RAIL

Kaylor, John D., and Edward J. Murphy (Bureau of Commercial Fisheries Technological Laboratory, Emerson Avenue, Gloucester, Massachusetts 01930)
Fishery Industrial Research 6, No. 3, 147-154 (August 1970)

For fresh haddock and cod fillets to be irradiated and shipped commercially to distant points in the United States, the fillets must be kept near the temperature of ice during distribution. To check on the temperatures to be expected, we surveyed the principal methods of commercial distribution of fresh fishery products. We found that present commercial methods of distributing fresh haddock fillets result in fillet temperatures that average less than 40° F., a temperature that would be sufficiently low to permit shipment of irradiated fillets to the most distant parts of the country. [7 tables]

3.15

About 78 percent of the haddock landed were of a level of quality high enough to warrant their being irradiated. Because haddock and cod, Gadus morhua, are handled similarly, this conclusion also applies to cod. Thus, the quality of fish would not be a problem in the irradiation preservation of fresh haddock and cod fillets. [3 tables, 1 reference]

3.15

3.15 EFFECT OF γ-RADIATION ON THE AMINO ACID COMPOSITION OF THE MUSCULAR TISSUE OF FISH

Maslennikova, N. V. (U.S.S.R.)
Chemical Abstracts 72, No. 17, 86914x (April 27, 1970)

3.15

Advances in Radiation Chemistry, Vol. 1, by Milton Burton and John L. Magee (editors). xi + 401 pp. Wiley (Interscience), New York and London, March 1970. 155s.

The reviewer examines this new series as a possible duplication of the effort represented by contributions in Radiation Reviews and Current Topics in Radiation Research. He concludes that a critical review of subjects and a frequency of publication controlled by developments in an area should obviate waste and duplication. Further, since Radiation Reviews' terms of reference are somewhat broader than radiation chemistry, and since Current Topics in Radiation Research tends to concentrate on radiation developments that are allied to biology, no conflict need arise.

Vol. 1 of Advances in Radiation Chemistry contains four papers, all heavily weighted toward theory: "Charged Particle Tracks and Their Structure," by A. Mozumder; "Theory of Transient Negative Ions of Simple Molecules," by Joseph C. Y. Chen; "Chemical Synthesis by Ionizing Radiations," by C. W. Wagner; and one on the radiation chemistry of water, by J. K. Thomas. The reviewer suggests that future volumes will no doubt correct the balance.

3.2345 THE UNIFORMLY RETREATING ICE FRONT MODEL

Gunn, R. D. (Department of Chemical Engineering, University of Texas, Austin)
Refrigeration and Air Conditioning 73, No. 866, 85-86, 90 (May 1970)

Freeze-drying is becoming increasingly important as a means of food preservation because of the excellent flavor retention of the final product. However, it would be even more widely used if the high cost of removing the water could be reduced. A rational approach to the problem requires a quantitative understanding of heat and mass transfer mechanisms, and, thus, much research is underway in this area. One of the more promising lines of investigation has been the development of the uniformly retreating-ice front model. The eventual goal of such a model is to be able to predict the quality of the drying times of the final product, the variation of dryness among individual pieces for any given material, and the effect on these variables of both material handling before drying and the drying equipment and process used. Thus optimum handling procedures, equipment, and processes can be designed for every product under consideration.

The author first discusses mathematical models in general and then describes the uniformly retreating ice front model. He concludes that development of such a model provides the means of answering such questions as (1) At what pressure can the greatest drying rate be attained? (2) How greatly will the introduction of helium or hydrogen improve the drying rate? and (3) For a given type of equipment, what is the magnitude of external resistance to mass transfer? Although qualitative answers to these questions were known before the freeze-drying model

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3.332 COOPERATIVE STUDY RESULTS - PART II.
TESTS COMPARE MOISTURE LOSSES IN FRESH AND FROZEN HERRING

Lane, J. Perry, and Clarence J. Carlson (Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Mass.)
Quick Frozen Foods 32, No. 12, 95-96 (July 1970)

This article concludes a study conducted jointly by the authors and the Maine Sardine Council (see Commercial Fisheries Abstracts 23, No. 9, 19, Sept. 1970).

Herring caught in March were either frozen, precooked, and canned or precooked in the fresh state and canned. Freezing has little effect on the amount of moisture lost during precooking. The frozen products were stored for 6 months, during which time they were tested monthly for rancidity. Although rancidity did develop in the frozen herring, it did not become pronounced enough to affect appearance, flavor, or odor of the product.

Herring caught in July were frozen in blocks and kept in cold storage until they could be processed. When these herring, which had food in their digestive tracts, were thawed, brined, packed, and precooked, the ingested food caused their bellies to burst, so they were considered unsuitable for further processing.

From these two tests, the authors drew the following conclusions: (1) nonfeeding Maine herring caught in March can be frozen and stored at temperatures of -10° or -20° F. for up to 6 months without any adverse effect on their suitability for canning; (2) the quality of the canned product made from block-frozen, glazed herring is apparently the same as that of the product made from block-frozen, unglazed herring; (3) freezing and glazing individual herring is not recommended,

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3.2387 FROZEN SEAFOOD PACKAGING SYSTEM OPENING INACCESSIBLE MARKETS

Anonymous
Quick Frozen Foods 32, No. 12, 87-88 (July 1970)

Frozen seafood can be shipped in a new leakproof package on any type of carrier--airplane, bus, truck, railroad car--without danger of being contaminated or causing odors. The core of the packaging system is an injection-molded, wide-flanged, polyethylene tray that will withstand extremely cold temperatures without any loss of strength. The trays, which come in sizes that will hold from 10 to 150 lb. of fish fillets, are placed flange to flange and heat-sealed (in 6 sec.) to form a single unit. Four of these units are then packaged in a fiberboard container lined with leakproof polyethylene and at least 1 inch of foamed polystyrene insulation. For use with products that have a high moisture content or that are packed in ice, a moisture-absorbing foam pad is available.

All materials used in the system exceed the minimum requirements for leak and structural integrity prescribed by the National Fisheries Institute (1969); all are chemically acceptable by the USDA for food packaging. The containers are shipped in kits that can be assembled in 2 min. (trays and sealing machines are separate). They weigh as little as 3.5 lb. per 100 lb. of fish capacity. [3 photographs]

4.7 (9.2)(1.0111) FATS AND OILS IN CANADA. ANNUAL REVIEW 1969

Anonymous
Prepared by the Edible Oils Section, Bakery, Cereals and Edible Oils Division, Agriculture, Fisheries and Food Products Branch, Department of Industry, Trade and Commerce, Ottawa 4, Ontario, Canada. Queens Printer for Canada, Ottawa, 119 pp. (March 1970)

This publication contains statistical information on the fats and oils industries in Canada along with an interpretation of the data. Certain significant technical and economic developments are also reported. The sections cover: Canadian Review; World Fats and Oils Review; Canadian Situation; Soybeans, Soybean Oil, Soybean Meal; Rapeseed, Rapeseed Oil, Rapeseed Meal; The Canadian Sunflowerseed Situation; The Canadian Mustard Seed Situation; Flaxseed, Linseed Oil, Linseed Meal; Canadian Trade in Specified Edible Vegetable Fats and Oils; Canadian Trade in Specified Inedible Vegetable Oils; Canadian Marine Oil and Fish Meal Situation; Canadian Trade in Animal Fats; Review of Finished Products; Price Trends; and Margarine Production in the United States. A brief report is given on "The Chemical and Nutritive Characteristics of Herring Meals Produced on the Atlantic Coast." (Available from the Fisheries Research Board of Canada, Halifax Laboratory, P.O. Box 429, Halifax, Nova Scotia, Canada.)

3.3341 PREVENTION OF OFF-FLAVORS IN FOODS

French Patent 1,578,691
Kyowa Fermentations Industry Co., Ltd.
Chemical Abstracts 72, No. 25, 131260u (June 22, 1970)

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since it results in excessive damage to the fish; (4) the canned product made from thawed herring immersed for 75 min. in brine (25 degrees salimeter) at ambient temperature contains from 0.9 to 1.3% salt, whereas that made from thawed herring brined overnight contains up to 3.9% salt; (5) after being brined, frozen herring can be processed in the same way that fresh herring is processed; (6) since herring caught in July and August and frozen for later canning show severe belly-cavity deterioration during processing, they are not considered suitable for such a processing method; (7) canned sardines prepared from herring frozen 24 hours after capture and kept at -10° or -20° F. for up to 6 months show no sign of rancidity; (8) because of weight loss during processing, special care may be necessary to ensure that the weight of the filled can is proper.

In August, freshly caught herring were kept in refrigerated sea water (temperature 33° to 34° F.) overnight and then successfully run through Norwegian orienting-cutting machines. The fish were then brined (22 degrees salimeter) for 15, 30, or 45 min.; packed; and processed in the usual manner. The salt content of the canned product was 0.6-0.8%, 0.7-0.9%, and 0.8-0.9%, respectively. From this experiment, the authors conclude that holding herring on board a carrier vessel in refrigerated sea water rather than in the conventional dry salted state is feasible. [1 table, 1 photograph]

3.332

3.234 METHOD OF FREEZING FOODSTUFFS

British Patent 1,190,092
General Foods Corp. (U.S.A.) (pat.)
BFMIRA Abstracts 23, No. 6, Abstract No. 1337, 325 (June 1970)

The foodstuff is frozen while under methane, nitrogen or air at a pressure greater than 100 psig. The pressure is then released and the foodstuff may be freeze-dried or air dried or thawed or extracted with a solvent. Freezing under pressure renders the foodstuff more permeable and thus easier to dehydrate. The frozen foodstuff need not be dried. If used frozen it will cook more quickly.

Reprinted

3.2342 FREEZING PROCESS

British Patent 1,182,693
E. Dupont de Nemours and Co. (pat.)
Food Technology 24, No. 9, 96 (September 1970)

Food is dropped into a bubbling bath of a halogenated alkane having a boiling point of -5° to 50° C. FTP

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was developed, the answers were not universally accepted. The development of the mathematical model removes this aspect of freeze-drying from the realm of speculation and makes possible the design, execution, and interpretation of laboratory experiments that will give factual and quantitative answers to the questions.

[2 figures, 6 references]

3.2345

3.25 REFRIGERATION OUTDOORS

British Patent 1,170,407
The Trane Company, La Crosse, Wisconsin 54601 (pat.)
Refrigeration and Air Conditioning 73, No. 867, 72 (June 1970)

The varying temperatures under which outdoor refrigerators may have to work could cause wide variations in suction pressure and in the amount of liquid refrigerant that enters the heat exchanger. The result is evaporation starvation and refrigerator clogging. To prevent these effects, a reversible cycle refrigeration system that compensates for the ambient temperature has been developed.

LB

3.26 DISPLAY CASE

British Patent 1,182,850
Clark Equipment Co., Buchanan, Michigan (pat.)
Refrigeration and Air Conditioning 73, No. 867, 72 (June 1970)

A case for displaying frozen food has an opening through which all the refrigerated material can be reached. LB

3.25 REVERSIBLE COOLER

British Patent 1,169,965
Mecano-Bundy G.m.b.H. Dischinger Strasse 9, Heidelberg-Pfaffengrund, West Germany (pat.)
Refrigeration and Air Conditioning 73, No. 867, 72 (June 1970)

A reversible heat exchanger that either heats or cools the compartment of a vehicle, depending on the direction of flow of the medium, will not ice up and is claimed to be completely effective at ambient temperatures of less than 32° F.

LB

3.63 DEHYDRATION PROCESS

U.S. Patent 3,498,209
Morgan, D. G. (pat.)
Food Technology 24, No. 8, 70 (August 1970)

The food to be dehydrated is positioned between the plates of a rack in a vacuum chamber. The food is heated by eddy currents induced into the plates.

FTP

3.2387 INSULATED CONTAINERS

British Patent 1,182,660
Vortair Engineering Ltd., City Wall House, Finsbury Pavement, London, E.C.2, England (pat.)
Refrigeration and Air Conditioning 73, No. 867, 72 (June 1970)

Large insulated containers such as those used for frozen sea cargo are cooled with cold air produced by a vortex-tube cold-air generator. The cold-air outlet is attached to the container; the hot-air outlet can be used to heat the ship.

LB

6.130 FEASIBILITY OF USING TENNESSEE RIVER FISH FOR FISHERY PRODUCTS

Krzeczkowski, Richard A. (Bureau of Commercial Fisheries, Technological Laboratory, Ann Arbor, Michigan)
Fishery Industrial Research 6, No. 3, 93-103 (August 1970)

Populations of reservoir fishes are dominated by species that are of low market value, yet a useful outlet is needed for them.

The present study investigated the nutritional aspects of some of the principal species of fishes growing in reservoirs. Carp, fresh-water drum, gizzard shad, and threadfin shad from Kentucky Lake on the Tennessee River were harvested commercially and were rendered into fish meal. The seasonal variations in proximate composition of the fish, the composition of extracted fish oil, the presence or absence of thiaminase in the materials, the concentration of DDT and DDE in the raw fish, and the comparative value of the fish meal in broiler rations were determined.

In the raw fish, the percentage of protein ranged mostly from about 14 to 18. In the fish press cake, the percentage of protein ranged mostly from about 20 to 26, the percentage of oil ranged from about 3 to 9, and the percentage of ash ranged from about 6 to 16.

The gross properties of the oil were closely similar for all three species. The iodine value ranged from 121 to 123, the saponification value ranged from 189 to 192, and the oils were all light in color. These oils are high in fatty acids 16:1 and 18:1 and should be of industrial value.

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Extracter: FTP

6.50 CATFISH BYPRODUCTS

Anonymous
Feedstuffs 42, No. 33, 29, 32 (August 15, 1970)

A Kansas State University (Manhattan, Kansas) news release reported the results of Leroy Skoch's graduate work on the use of processed catfish wastes as animal food. One of his tests revealed that chicks fed diets supplemented with catfish byproducts grew equally well as did chicks whose diet was supplemented with marine fish meal. After testing computer-programmed diets in which catfish byproducts furnished up to 52% of the protein, Skoch concluded that use of fish byproducts to provide up to 25% of the total protein is economical in dry diets for dogs and in starter rations for broilers, fingerling catfish, and pigs.

LB

6.15 (1.23) CHEMICAL COMPOSITION OF ATLANTIC AND GULF MENHADEN FISH SOLUBLES

Soares, J. H., Jr., David Miller, and M. E. Ambrose (National Center for Fish Protein Concentrate, Bureau of Commercial Fisheries, College Park, Maryland)
Feedstuffs 42, No. 33, 65, 71 (August 15, 1970)

Fish solubles, a byproduct of the wet-reduction method of manufacturing fish meal, contain minerals, part of the oil, some of the particulate matter that passes through the pressing screens, as well as much of the gelatinous blood and interstitial protein of the fish. Although fish solubles are being incorporated into poultry and pig diets at levels of from 2 to 5%, data on their chemical composition are limited. To supply feed formulators with the information needed for least-cost computer formulations, the authors conducted chemical and biological tests on fish solubles obtained from fishmeal plants that process Gulf Coast menhaden (Brevoortia patronus) and from plants that process Atlantic Coast menhaden (B. tyrannus). Seven samples of Gulf menhaden solubles and 17 samples of Atlantic menhaden solubles were analyzed for proximate composition (Kjeldahl nitrogen, ethyl ether extractable fat, moisture, and ash), total fat, micro- and macro-minerals, and amino acids by the method described by Kifer et al. in 1968; for ammoniacal nitrogen by the Magnesium Oxide Method 2.050 described in the AOAC (1965) Methods of Analysis; and for available lysine by Carpenter's method (1960).

The analyses showed that the proximate composition, the total fat, and the ammoniacal nitrogen values for the two types of menhaden solubles were essentially the same. The overall average concentration of protein (Kjeldahl N x 6.25) and

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LB

6.54 THE FISH PROTEIN CONCENTRATE STORY.
10. U.S. BUREAU OF COMMERCIAL FISHERIES FPC's:
NUTRITIONAL QUALITY AND USE IN FOODS

Sidwell, V. D., B. R. Stillings, and G. M. Knobl, Jr. (National Center for Fish Protein Concentrate, Bureau of Commercial Fisheries, College Park, Md. 20740)
Food Technology 24, No. 8, 40-42, 44, 46 (August 1970)

This paper, the latest of a series on fish protein concentrate (FPC), gives (1) data on the nutritive value (chemical analysis and animal-feeding values) of samples of FPC prepared from seven species of fish and (2) information on how FPC can be used to increase the quantity and quality of protein in various food products. The FPC samples were prepared by the isopropyl extraction method from red hake, Atlantic menhaden, Atlantic herring, Northern anchovy, ocean pout, alewife, and Moroccan sardines.

Tables of data are presented on the proximate composition (moisture, crude protein, volatiles, ash, and lipids), essential amino-acid content, protein efficiency ratio (PER) of the FPC samples, and a table on the nutritive quality (PER) of vegetable proteins supplemented with FPC is also given. The protein content of the various FPC samples ranged from 78 to 88%; lipid content, from 0.07 to 0.24%. The amino-acid content of the samples compared favorably with that of whole egg. The nutritive value of the FPC as measured by the PER values, was equal to or better than that of casein.

The second section of the paper shows how FPC can be used in bread, pasta, crackers, cookies, soups, tortillas, and beverage mixes.
[8 tables, 9 references]

FTP

6.15

of ash was 31.75 and 7.81 percent, respectively. On a dry-matter basis, these values are very nearly the same as the values for menhaden fish meal. The fat content, on a dry-matter basis, however, is somewhat higher than that of fish meal.

The fish solubles contained substantial amounts of essential amino acids. The concentration of sulfur amino acid cystine averaged 0.95% of protein in Atlantic menhaden solubles and 1.28% in Gulf menhaden solubles. This overall average of 1.05% is 0.15% of protein higher than that reported for menhaden fish meal. The only other essential amino acid found at a higher level in fish solubles than in fish meal was glycine (with an overall average value of 8.73% of protein). The widest variation in concentration between the amino acids from the two types of fish solubles was in histidine, Atlantic menhaden averaging 2.79% of protein and Gulf menhaden averaging 1.72% of protein.

The concentration of most minerals is lower in fish solubles than in fish meal. Aluminum content of Gulf Coast solubles, however, was somewhat higher, although that of Atlantic Coast solubles was appreciably lower. Similar differences in aluminum content have been noted in fish protein concentrate made from these two types of menhaden; thus the authors conclude that aluminum apparently exists in the raw fish and does not occur as a result of processing. A wide variation in the concentration of copper and iron was also noted. This variation may be the result of the solubles' picking up small amounts of copper and iron from the processing equipment. The authors conclude from the macro- and micro-mineral analyses that fish solubles are good sources of trace minerals.

In addition to the data from 40 different chemical analyses, the report contains the handbook value that can be used for menhaden fish solubles in general. [4 tables, 5 references]

6.54 NEW STARTER FOR SAUSAGE
(2.05)

Anonymous
Canner/Packer 139, No. 7, 30 (July 1970)

Most sausage makers use a bacterial starter culture to ferment their sausages. These bacteria produce lactic acid, which is associated with the normal tangy flavor of sausage. Although staphylococci do not grow in an acidified environment, they will grow on the outside surfaces of the sausage, where oxygen is available. Since a bacterial starter culture usually takes from 16 to 20 hours to produce lactic acid, some staphylococci can grow and produce a toxin that could cause food poisoning before the sausage becomes acidic enough to prevent this proliferation. To solve the problem, Robert Deibel, bacteriologist at the Food Research Institute, University of Wisconsin, advocates use of glucono-delta lactone (GDL) as a starter culture. During processing, GDL is converted to gluconic acid. Within 3 to 5 hours, enough acid is formed in this chemical starter to prevent staphylococcal growth in the sausage. LB

6.54 MARGARINE COMPOSITIONS

Canadian Patent 839,658
Mijnders, A., H. W. L. Westenberg; Unilever Ltd. (pat.)
Food Technology 24, No. 9, 56 (September 1970)

Margarine with butterlike qualities contains an olein fraction (melting point of 30°-36° C.) of a rapidly crystallizing hydrogenated animal or vegetable fat. FTP

6.130

All samples of raw fish except those of fresh-water drum showed thiaminase activity; however, all the rendered products were thiaminase inactive.

In the raw fish, the concentration of DDE and DDT ranged from about 1.1 to 3.1 parts per million for carp, from about 1.2 to 3.6 parts per million for fresh-water drum, and from about 0.35 to 1.0 parts per million for shad.

In the fish meals, the protein ranged from about 52 to 62 percent; oil, 6 to 16 percent; ash, 7 to 32 percent; and moisture, 5 to 10 percent.

The conclusions from the work are that the carp, fresh-water drum, and shad are suitable for the production of fish meal and fish oil. [4 tables, 10 reference]

6.135 OIL DEODORIZATION

U.S. Patent 3,506,696
Baker, J. S., J. B. Edwards; The Proctor & Gamble Co. (pat.)
Food Technology 24, No. 9, 56 (September 1970)

The invention involves a process for the continuous high-temperature (350°-500° F.) steam deodorization of edible oils in a packed chamber. FTP

6.135 OIL DEODORIZATION

Canadian Patent 838,013
Brebant, R.; SODEO, S.A. (pat.)
Food Technology 24, No. 8, 68 (August 1970)

Edible oils are deodorized with steam. FTP

6.33 AGAR-AGAR PRODUCT

Japanese Patent 5432/70
Kikuchi, Terukichi (pat.)
Food Technology 24, No. 8, 70 (August 1970)

Aqueous solutions of commercial agar-agar are treated with acetone to coagulate the material. FTP

6.33 MANUFACTURE OF AGARS IN GIFU PREFECTURE. XXXII. AGARS PREPARED FROM IMPORTED RAW OGONORI (GRACILARIA SPECIES)

Hayashi, Kaneo, Takeshi Hiramitsu, Takeshi Nakamura (Gifu Univ., Gifu, Japan)
Chemical Abstracts 72, No. 14, 68450p (April 6, 1970)

6.34 ALGIN COATING REMOVAL

U.S. Patent 3,493,398
Earle, R. D. (pat.)
Food Technology 24, No. 8, 70 (August 1970)

Algin coatings on food are removed without altering or damaging the coated food product. FTP

7.1 THE PRINCIPLES OF CONFORMATIONAL ANALYSIS
(7.590)(0.30)

Barton, D. H. R. (Imperial College of Science and Technology, London, S.W.7, England)
Science 169, No. 3945, 539-544 (August 7, 1970)

This article is the lecture delivered by the author in Stockholm, Sweden, in December 1969 when he received the Nobel Prize in Chemistry. It is a chemical, historical account of conformational analysis in chemistry. The definition of conformation given by Barton and Cookson (1956) and referenced here is: "The conformations of a molecule (of defined constitution and configuration) are those arrangements in space of the atoms of the molecule which are not superposable upon each other." The "constitution" is the specification of the atoms that are bound to each other in the molecule.

The author refers to the application of conformational analysis to biology. An enzymatic reaction involves the enzyme (a large molecule) and the substrate (a relatively small molecule). To understand the mode of action of an enzyme, one must know not only the functional group reactivity but also the conformations of the substrate and of the enzyme. Researchers are now able to specify, with most substrates, the preferred conformation involved in the reaction. Soon they will be able to describe in exact detail the conformation of steroidal substrates. The author states that such knowledge must soon have important consequences in biology.
[49 figures, 72 references]

FTP

7.86 COLLABORATIVE STUDY OF PROCEDURE FOR DETERMINING
(0.5)(3.337) COMMERCIAL STERILITY OF LOW-ACID CANNED FOODS

Denny, C. B. (Natural Canners Assoc., 1133-20th Street, N.W., Washington, D.C. 20036)
Journal of the Association of Official Analytical Chemists 53, No. 4, 713-715 (July 1970)

Commercial sterility in canned low-acid foods, by definition, is that condition in which all Clostridium botulinum spores and all other pathogenic bacteria have been destroyed, including the heat-resistant organisms that could produce spoilage when the product is exposed to normal storage and distribution practices. An earlier test by seven cooperating laboratories revealed inadvertent laboratory contamination during sterility testing of canned salmon. Therefore, the present collaborative test was carried out.

Each of nine food laboratories examined eight samples of canned salmon (six samples were sterile and two had been inoculated). Seven different bacteriological media were used. Only three of the nine laboratories were correct in all the tests. A total of 9.1% of the determinations was wrong. In 378 culturings of sterile cans, bacterial contamination occurred in 21 (7.1%). The authors recommend a second collaborative study.
[4 tables, 1 reference]

FTP

7.9 RECOGNITION OF BUNKER OILS BY THIN-LAYER CHROMATOGRAPHY
(9.19)
Sipos, J. C., R. G. Ackman, and R. F. Addison (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia)
New Series Circular No. 37, 6 pp. (May 6, 1970) Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia) Free.

Bunker oils are shipped in large quantities and are present in the fuel tanks of many merchant ships. Slicks from these sources may wash ashore. Bunker oil is normally based on the residues remaining after the volatile fractions have been removed by distillation and cracking in a refinery. The composition and properties of bunker oil depend upon the origin of the starting crude oil, the treatment, and the blending with other oil fractions. The rough treatment given the crude oil causes breakdown of its heavy components to certain basic skeletons--for example, coronene and perylene. Aromatic compounds of the coronene and perylene type have the property of fluorescing when irradiated with ultraviolet light. The research workers postulated that if these groups could be recognized and their proportions estimated, then it would be possible to recognize bunker oil slicks or beach deposits and to determine bunker oil pickup of animal life.

A thin layer chromatogram (TLC) of a bunker C oil gave a long faint fluorescent streak with several bright superimposed oval spots (visible only under ultraviolet light illumination--3650 Å was satisfactory). The mobile fractions were apparently of aromatic hydrocarbon nature. Coronene and perylene showed the greatest similarity in TLC mobility to the bunker C oil spots.

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FTP

8.7 MANUFACTURING REQUIREMENTS OF FOOD FOR AEROSPACE FEEDING

Flentge, Robert L., and Ronald L. Bustead
Rept. No. SAM-TR-70-23, 239 pp. (May 1970) (School of Aerospace Medicine, Brooks AFB, Texas)
U.S. Government Research & Development Reports 70, No. 10, 51 (July 10, 1970) Available from the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia 22151. AD-705-603, Price $3.00.

Manufacturing requirement documents were written which describe the food processing and packaging technology used in space feeding systems. These documents combine information contained in the original Space Food Prototype Production Guides with additions and modifications developed through food testing and manufacturing experience. They were designed to provide complete and systematic descriptions concerning the production environment, equipment, raw ingredients, processing and packaging procedures, and end item specifications used in the manufacture of space foods. These documents include cross references to microbiological requirements, food prototypes, quality assurance provisions and food coatings and coating methods. The use of these manufacturing requirement documents in space food production has essentially eliminated a requirement for granting specifications waivers for flight foods.

Authors' abstract

7.872 (9.6) THE DETERMINATION OF ORGANIC PEROXIDES

Johnson, R. M., and I. W. Siddiqi
Monographs in Organic Functional Group Analysis, Vol. 4, ix + 119 pp. Pergamon Press, New York (1970), $6.75.
Reviewed by A. G. Davies
Nature 226, No. 5251, 1177 (June 20, 1970)

A wide variety of methods has been used to analyze the low-concentration organic peroxides formed by the reaction of aerobic oxygen with organic compounds. This book is a guide to the most suitable. It begins with an introductory chapter on the occurrence of organic peroxides, a classification of the various types, and the relation between their reactivities and their structures. Then it discusses the various types of chemical and physical analytical methods; details the procedures used with the recommended methods; and tabulates examples of their applications, along with such data as half-wave potentials, R_f values, and retention times. The reviewer pronounces it a useful, thorough, critical compilation--the best source of reference available in the field. LB

9.1 (9.6) MARINE BIOLOGY. AN INTRODUCTION TO ITS PROBLEMS AND RESULTS

Friedrich, Hermann
Translated from the German by Gwynne Vevers
Published by Sidgwick and Jackson, London, xii + 474 pp. (January 1970). 70s hard-bound, 25s paper.
Reviewed by Derek Dorsett
Nature 226, No. 5251, 1176 (June 20, 1970)

The sea is a dynamic system in which the atmosphere, the waters, and the continental margins interact to influence the vast production cycles on which the sea's economy is based. Information about the physical and chemical conditions within the environment that affect the biological systems in the sea must be drawn from a wide variety of sources, many outside the context of biology. Dr. Friedrich, an ecologist himself, has done just that. He has also included much material that was previously available only as original papers and a quantity of European literature that might otherwise be neglected because of the language of the original. [206 figures, 56 tables, 20 pp. of references] LB

9.11 SUBMERSIBLES

Pritzlaff, John A. (Deepstar 20,000 Program, Westinghouse Ocean Research and Engineering Center)
Oceanology International 5, No. 6, 38-43 (June 1970) (Oceanology International, Industrial Research Publications Co., Beverly Shores, Indiana 46301)

A submersible (or submarine) is a ship or craft that can operate below the surface of the water. The author discusses the design factors of submersibles. [5 illustrations] PTP

7.597 DETERMINATION OF FORMALDEHYDE IN FOODS

Mohler, K., and G. Denbsky
Z. Lebensmittelunters. u.-Forsch. 142, No. 2, 109-120 (1970) (In German)
BFMIRA Abstracts 23, No. 8, Abstract No. 1548, 381 (August 1970)

Methods for formaldehyde determination in foods are discussed, with particular reference to the phenylhydrazine method of Buchanan & Schryver (Analyst, Lond. (1909) 34 470) which was tested in detail. The red dye formed by interaction of formaldehyde, phenylhydrazine and potassium ferricyanide was identified as 1,5-diphenyl formazan. The analytical procedure, modified from the original, and spectrophotometric colour measurement are fully described. The method is considered to be of general application and very sensitive. Values for formaldehyde content of a number of foods are included. Reprinted

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7.9

Better separation of the bunker C oil spots was achieved by two-dimensional TLC using hexane-benzene (1:1) as the mobile phase for the first direction and methanol-chloroform (1:1) as the mobile phase for the second direction. The authors suggest that separation of bunker C oil by two-dimensional TLC and the determination of the occurrence or relative proportions of at least five spots of aromatic hydrocarbons or other groups or classes of hydrocarbons could be used as a "fingerprint" approach to the identification of oil slicks or beach deposits and to examine animal life for bunker C oil pickup. [5 figures]

7.42 (9.19)(1.81) TRACE ELEMENT DETERMINATION BY NEUTRON ACTIVATION ANALYSIS

Dear, B. D.
Chemical Abstracts 72, No. 13, 64032f (March 30, 1970)

7.44 COMPARATIVE ANALYSIS OF VARIANCE OF THE KJELDAHL NITROGEN AND A NEUTRON ACTIVATION NITROGEN TECHNIQUE

Doty, W. H., and A. W. Munson (Ralston Purina Co., 835 South 8th Street, St. Louis, Missouri 63199), D. E. Wood, and E. L. Schneider
Journal of the Association of Official Analytical Chemists 53, No. 4, 801-803 (July 1970)

Previous workers have described in the same journal [52, 953-956 (1969)] a technique for the determination of nitrogen by neutron activation analysis. The present paper is a comparative study of the variance components of the neutron activation analysis and the Kjeldahl nitrogen analysis. Four hundred and forty-eight assays were made by each method on 56 samples from 17 types of feeds and ingredients (including fish meal).

The coefficient of variation of the neutron activation data was 1.07; that for the Kjeldahl data was 0.58. The authors conclude that there is a sound statistical base for development of neutron activation as an alternative method for the measurement of nitrogen in feed and food products and ingredients. [2 tables]

7.879 (3.249) RELATION BETWEEN THE DECOMPOSITION PRODUCTS OF ADENOSINE TRIPHOSPHATE IN FROZEN FISH AND FRESHNESS

Fujii, Yutake (Tokai Reg. Fish. Lab., Tokyo, Japan)
Chemical Abstracts 72, No. 16, 53834t (March 16, 1970)

9.11 (9.2) FUTURE PROSPECTS FOR PHYSICAL OCEANOGRAPHY

Stommel, Henry (Department of Oceanography, Massachusetts Institute of Technology)
Science 168, No. 3939, 1531-1537 (June 26, 1970)

The author discusses the question "are present plans [national and international] for expanded oceanographic research designed to solve basic scientific problems". He states that no oceanographic problem has yet been formulated that can justify a data-gathering system on a global scale involving several hundred widely dispersed buoys. On the other hand, we can envisage a carefully guided evolution of large-scale experiments in the ocean that would substantially increase our understanding of the ocean but would require an equivalent, large investment of funds and effort. To set up a routine global data-gathering system at this time would be a mockery to the scientific advisors. Nevertheless, the course recommended by the scientists will require experts in strategic positions.

The scientist sees the ocean as a hydrodynamic phenomenon. Detailed data are needed on the velocity field in the ocean from the microscales of mixing processes within the thermocline up to scales as large as the gyres of the general circulation. Measurements of the ocean must be made at a level of technological sophistication way beyond the present level and beyond that proposed by routine monitoring. A few years of ship's time, or access to another's monitoring system, will not provide the kind of information the scientist needs about the oceanic velocity field. Some carefully designed measurement programs will be needed and,

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9.11 DIVER PERFORMANCE IN COLD WATER

Stang, Paul R. (U.S. Navy Deep Submergence Systems Project, Chevy Chase, Maryland) and Earl L. Wiener (University of Miami, Coral Gable, Florida)
Human Factors 12, No. 4, 391-399 (August 1970)

We must understand how man functions in the undersea environment in order to optimize the designs of man-made systems intended for underwater work. Information is lacking in the area of the effect of cold water on the working performance of a diver. Basic questions that remain to be answered are: (1) How does the performance of a diver drop as the temperature of the water is lowered? (2) How is the diver's performance affected by long exposures in cold water? (3) How does the diver's performance vary from task to task, and how does his work output vary over time at different water temperatures? The present study was carried out to provide quantitative data relative to these problem areas.

In these tests, 12 experienced divers repeatedly performed several representative underwater work tasks for 90-min. sessions at water temperatures of 50°, 60°, and 70° F. Six tasks, representative of underwater work of low activity, were used. Performance was measured by the time required to complete the task. Choice reaction time, with mental arithmetic as loading task, and four physiological measurements were recorded. The physiological measurements were oral and skin temperatures, air consumption, and the "V" test (a measure of finger numbness). The divers worked in 6½ feet of water using full 3/16-inch thick wet suits and SCUBA equipment.

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9.15 ACANTHASTER PLANCI (CROWN OF THORNS STARFISH) AND THE GREAT BARRIER REEF

Reports of the Australian Academy of Sciences, No. 11. Australian Academy of Sciences, 20 pp. (n.d.) free
Rupert Ormond (reviewer)
New Scientist 47, No. 711, 202 (July 23, 1970)

These findings of the committee appointed to evaluate the reported widespread destruction of the Great Barrier Reef by Acanthaster planci have their main value in the assessment of the true extent of the destruction being wreaked by the coral-eating starfish. Together with the American survey of the extent of damage being done in Micronesia, it demonstrates how widely spread throughout the Pacific starfish infestations have become. It also confirms how uncertain of the causes the experts are.

9.15 (9.19) RETENTION OF CHROMIUM-51, IRON-59, COBALT-60, ZINC-65, STRONTIUM-85, NIOBIUM-95, INDIUM-141, AND IODINE-131 BY THE ATLANTIC CROAKER (MICROPOGON UNDULATUS)

Baptist, J. P., D. E. Hoss, and C. W. Lewis (Radiobiol. Lab., Bur. of Commer. Fish. Beaufort, North Carolina)
Chemical Abstracts 72, No. 21, 107590f (May 25, 1970)

9.16 (9.15)(1.81) SEED MOLLUSC PRODUCTION

Bowbeer, Arthur
World Fishing 19, No. 5, 44-45 (May 1970)

The Shellfish Association of Great Britain held its first conference last April in London's Fishmongers' Hall. Only eight papers were presented during the 2-day program, most of the time being allotted to question and discussion. This part of the author's summary deals with oysters only; a future installment will cover the remaining species. Five papers concerning oysters were given.

J. T. C. Knowles, head of the British White Fish Authority's seed mollusk unit, discussed development of techniques for producing seed mollusks, mainly oysters. Although the Pacific oyster gigas seems to offer more promise of success than does the English oyster edulis, its somewhat different appearance may necessitate a large-scale marketing and educational program among British consumers.

P. R. Walne, of the Fisheries Experimental Station (Ministry of Agriculture and Fisheries), Conway, reported some degree of success in cultivating oysters entirely in trays.

K. H. Haywood, of the WFA's industrial development unit at Hull, explained the value of the linear computer program his unit has devised. With the program, commercial growers can consider the financial hazard of many unpredictable variables and determine the cost per 1,000 of seed produced. They can also obtain figures for such considerations as production schedules and staffing needs.

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9.16 NEW PUBLICATION ON MARINE AQUACULTURE

McNeil, William J. (ed.)
Oregon State University Press, 172 pp. (1970). Price $6.
American Fish Farmer & World Aquaculture News 1, No. 7, 24 (June 1970)

The chapters in this book are from papers presented at the conference on Marine Aquaculture at the Marine Science Center, Oregon State University, Newport, Oregon, in 1968.

FTP

9.11 PRODUCTION OF CARBON MONOXIDE AND GASEOUS HYDROCARBONS IN SEAWATER: RELATION TO DISSOLVED OXYGEN

Wilson, D. F., J. W. Swinnerton, and R. A. Lamontagne (Ocean Sciences Division, Naval Research Laboratory, Washington, D.C. 20390)
Science 168, No. 3939, 1577-1579 (June 26, 1970)

Previous work has demonstrated vertical distribution of carbon dioxide and the gaseous hydrocarbons in certain oceanic areas. Distinct concentration maxima occur at various depths within the photosynthetic zone, suggesting a relation to biological activity. To examine the possibility that the gases might be produced from the dissolved organic carbon fraction in the sea water, the authors carried out a series of experiments with distilled water or natural sea water in which each was enriched with dissolved organic carbon material produced by cultured phytoplankton.

In the light, carbon monoxide, ethylene, and propylene were produced in cell-free distilled water or natural sea-water systems to which the dissolved organic matter produced by the phytoplankton had been added. In the dark, no or little carbon monoxide and no hydocarbons were produced in the distilled water systems; and only carbon monoxide was produced in natural sea water, but less was produced in the dark than was produced in the light.

[1 figure, 1 table, 7 references] FTP

9.11

to be scientifically useful, they must give first priority to questions of hydrodynamics. The author feels that, to date, the programs give little indication that they will do so. [11 references]

9.16 THERMAL VARIATION DANGERS IN AQUATIC TRANSFER PROCESS

Allen, Kenneth O. (Louisiana State University, Baton Rouge, La.)
American Fish Farmer & World Aquaculture News 1, No. 7, 10-12 (June 1970)

After a brief discussion of the temperature tolerance of fish, the author offers some practical recommendations for transfer of fish between fish farm ponds.

If the temperature change is less than 15° F., temper the fish for a few minutes. If the temperature change is greater than 15° F., use the following procedures.

Summer transfer.--Temper fish for several hours when transferring them from one pond to another pond of higher temperature. Temper fish over a period of 24 hours when transferring them from one pond to another pond at a lower temperature.

Winter transfer.--Temper fish for 2 or 3 days when transferring them from one pond to another at a higher temperature. Temper fish for up to 7 days when transferring them from one pond to another at a lower temperature.

Tempering, as defined by the author, is "adjusting the temperature slowly over a period of minutes or a few hours by mixing the two waters involved."

[4 illustrations] FTP

9.16

James E. Hanks, Director of commercial fisheries at the Biological Laboratory, Milford, Connecticut, and J. Richards Nelson, president of Long Island Oyster Farms, Inc., New Haven, Conn., described the collaboration between their two agencies. Of particular interest was their account of the measures they have taken to control starfish and oyster drills. They have found that Polystream, a byproduct of naphtha, will control drills for at least 3 months. It comes in pellets and is scattered on the surface, whence it sinks rapidly onto the oyster beds. If the predators are eradicated, the beds may not need redressing for 2 or 3 years. Use of this chemical costs from $200 to $300 an acre. (This refined chlorinated hydrocarbon was approved for marine use by New York and Connecticut after tests showed that all the animals normally found in untreated beds were still present in the treated beds.)

Long Island Oyster Farms controls starfish with string mops, scuba divers, a suction dredge, and quicklime. Boats equipped with string mops constantly patrol the perimeter of the beds. When a string brushes across the spine of a starfish, the spine curls and grasps the mop. Mops are cleared every 10 min. in very hot water carried on board the patrol boat. When a severe invasion of starfish is detected by scuba divers or the mop patrols, a 100-ft. diesel-powered barge with suction dredge, conveyor belts, water screens, quicklime sprinklers, and collection hoppers are brought into play. Since starfish are largely calcium carbonate covered by a fine layer of tissue, they can be severely burned by quicklime. If the burn time is long enough, they will not recover. Once or twice a year, or when the suction dredge is not available, the firm spreads quicklime on the surface above the oyster beds. The dosage is 2,000 lb. per acre. Apparently the rapid conversion of quicklime to slaked lime and its quick dilution and dispersion in water precludes pollution. [1 figure]

9.11 CARBON-13 IN BLACK SEA WATERS AND IMPLICATIONS FOR THE ORIGIN OF HYDROGEN SULFIDE

Deuser, W. G. (Woods Hole Oceanographic Institution, Woods Hole, Mass. 02543)
Science 168, No. 3939, 1575-1577 (June 26, 1970)

In the Black Sea, the amount of dissolved oxygen decreases with depth and is zero between 125 and 250 meters. A transition zone exists in which both oxygen and H_2S coexist; at greater depth the amount of H_2S increases, rapidly at first, but then levels off at 1,000 meters.

Organic matter contributes a small, but significant, fraction (between 3 and 5%) of the H_2S in the Black Sea. The most likely causes for the increase in H_2S are an increase in the productivity of the Sea in the recent geological past and an upward growth of the anoxic zone with a concomitant increase in the amount of dead organisms in the sediment.

[2 figures, 1 table, 15 references] FTP

9.11

Performance on all tasks except mental arithmetic decreased as water temperature decreased. The divers were able to operate at 50° F. for 90 min., but showed a large decrease in performance. Gross movements were less affected by the cold than were the fine movements, and simple assemblies employing both gross and fine movements were moderately affected. The data on the physiological measures showed the same trend as that on the performance tasks.

The authors conclude that divers must be supplied with auxiliary heat to their bodies if they are to perform effective work during prolonged dives in water temperatures below 60° F.

[1 figure, 1 table, 31 references]

9.16 FISH FARM ENCLOSURES. 2--WAVE FORCES AND CURRENTS
(0.8)
Milne, P. H.
World Fishing 19, No. 2, 30-31 (February 1970)

Coastal and offshore structures are usually designed to withstand the highest single wave relative to average wave heights. To calculate design wave height, one must know the characteristics of the wind field, the direction and speed of the wind field, the fetch length, and the variations of water depth along the fetch. Thus every site for a possible fish-farm enclosure must be investigated separately. For example, in a very narrow sea loch, the width of the fetch may have a limiting effect on the generation of waves; thus the ratio of fetch width to fetch length is quite important. Saville (1954) has given the fetch effectiveness for various ratios of fetch width to length.

In Part 2 of this series [see CFA 23, No. 7, 23 (July 1970)], the author showed how to calculate the highest mean hourly wind speed to be expected in a given area. So, for a given fetch length, the height and period of expected waves can be forcasted from such charts as those issued by the U.S. Army Coastal Engineering Research Center. Because any enclosure located along the coast will be subjected to a daily tidal cycle that will set up associated tidal currents, the design and orientation of the enclosure should be settled only after a hydrographical survey has been made to determine the strength and direction of these currents.

(over)

9.17 THINKING PLANET-WISE

Darling, Frank Fraser (Royal Commission on Environmental Pollution)
New Scientist 46, No. 697, 106-108 (April 16, 1970)

Brazil is burning and bulldozing the virgin forest of the Mato Grosso, one of the planet's most valuable buffer areas, to provide indifferent grazing for cattle of indifferent quality. To help reduce what it costs each taxpayer in Denmark to sustain the economic liability that is Greenland, the Danes are harvesting immature Atlantic salmon in their marine feeding grounds southwest of Greenland. If Dominica is to remain independent, she must have currency; so she sells her forests, the vegetational cover for her volcanic soil, to a Canadian firm that has worked out a method of using lop and top as well as good timber. The constant burgeoning of noneconomic sovereign states has outstripped the antiquated processes of international law to deal with the conservation of animate natural resources.

"What should the rest of the world do?" the author asks. Should we wait till one more country is devastated and presents the world with another famine ulcer? Or should we lend some money now, free of interest, contingent upon the adoption and conscientious pursuit of a conservation policy? Should all nations that have salmon rivers pay to prevent depletion of the Greenland fishing grounds? The author thinks so. And along with positive conservation must go the global control of pollution, the international necessity of promoting a situation where no wastes are unused, where all are recycled as valued byproducts. Only then can the concept of a self-sustaining ecosystem be attained.

[2 photographs]

9.19 INTERNATIONAL CONCERN ABOUT THE BALTIC SEA
(9.11)

Anonymous
New Scientist 46, No. 697, 105 (April 16, 1970)

In February, the International Council for the Exploration of the Sea issued a report on pollution of the Baltic Sea. ("Co-operative Research Report A15"). The report, compiled by a working group of representatives from all the nations washed by the Baltic, deals with sewage, pesticide, mercury, oil, and thermal pollution. Its most notable observation is that the oxygen levels of the Baltic's deep waters have decreased to such an extent, and the phosphate levels have increased so much, that the bottom, like the bottom of the Black Sea, will soon become lifeless.

The Baltic is separated from the North Sea by shallow, narrow sills that have a maximum depth of 18 m. The fresh water flowing into the Baltic greatly exceeds the evaporation, and the outflow of fresh water through the straits is about twice the inflow of saline water. (This condition is found in many silled fjords in Scandinavia, Canada, and other countries.) The fresh-water surface layer, which has a salinity of 6 or 7 parts per thousand, extends to a depth of from 50 to 70 m.; there the salinity increases sharply to between 10 and 12 parts per thousand. This halocline impedes the turbulent interchange of surface and deep waters, resulting in a body of water in the deeper parts of the sea that is relatively isolated. Assembled reports from data recorded at Baltic marine stations since the turn of the century present a picture of the Landsort Deep, south

(over)

9.19 MERCURY POLLUTION - FISHERIES DEPARTMENT ACTS QUICKLY TO SAFEGUARD PUBLIC HEALTH

Hearnden, E. H.
Fisheries of Canada 22, No. 10, 3-6 (May-June 1970)

This article recounts the quick, decisive steps taken by the Canadian government to combat mercury pollution in Canadian fishing waters. When the first reports of mercury contamination in fish from the Saskatchewan River reached Ottawa in late November 1969, the Department of Fisheries and Forestry immediately placed all fish from the Saskatchewan River system under detention. Using an atomic absorption spectrophotometer, a team of scientists and technicians began analyzing the fish. Any that contained over 0.5 p.p.m. mercury were destroyed in an incinerator; those that contained less were released for sale. Then the task of tracking down the source of the pollution began. By early May, a testing program that spanned the country was in full operation. Fishing grounds in upper Howe Sound, British Columbia; Lake Winnipeg; Lake St. Clair; parts of Lake Huron and Lake Erie; and the St. Lawrence were closed to commercial fishing. Free loans were made available to fishermen suffering hardship due to the closures.

Addressing a meeting of the Canadian Manufacturers Association in Toronto on April 8, Fisheries Minister Davis said that, although the amounts of mercury in Canadian fish were alarming, the problem had been solved in time to arrest any real danger to human beings. Stating that the closures had been expensive for the government, he added: "Basically, the industry which caused the problem must solve the problem. It must not only improve its housekeeping but also make

(over)

9.16 FISH FARM ENCLOSURES. 6--IMPERMEABLE BARRIER CONSTRUCTION
(0.8)

Milne, P. H.
World Fishing 19, No. 5, 28-29 (May 1970)

The estuary or tidal inlet ideal for raising fish is in an area where the tidal range is moderate or large, the sea water offshore is deep, and the catchment area in the hinterland is negligible. Impermeable barriers across the estuary or inlet allow for complete control of the fish farm enclosure. However, maintenance of a marine environment in which salinity is constant and the sea water can be interchanged and replenished requires installation of sluices or pumps. Inundation by fresh water, especially during a period of neap tides when replenishment of sea water is impossible, can be prevented either by digging a peripheral canal or by diverting the main streams in the surrounding catchment area from the enclosure. The barriers used by marine farmers in Scotland and France and the methods of controlling the environments within them are described. [1 photograph, 2 references] LB

9.16

Formulas are given for calculating wave and current forces on various types of netting (for design purpose, nets should always be considered in a foul state) and orbital velocities of the water particles within the waves. If two nets are used side by side, the resistance of the net structure must equal the combined resistance of the two nets.
[2 figures, 2 tables, 9 references]

9.17 DIVERSION AND COLLECTION OF JUVENILE FISH WITH TRAVELING SCREENS

Bates, Daniel W. (Bureau of Commercial Fisheries Biological Laboratory, Seattle, Washington 98102)
U.S. Fish and Wildlife Service Fishery Leaflet 633, 6 pp. (March 1970)

A horizontal traveling screen, suitable for screening fish or debris from power plant water intakes or irrigation diversions, was designed and operated by the Bureau of Commercial Fisheries during 1965-69. The structure consisted of a vertically hung, endless belt of wire-cloth screen panels, flush with the face of the water intake structure or at an angle to the direction of flow.

Field tests in different water approach velocities, with the screen traveling at various rates, proved that such a facility can be operated efficiently. The horizontal traveling screen, as described here, should contribute materially to the development of an efficient, relatively low-cost diversion facility for fish and debris. [6 figures] Author's abstract

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9.16 CULTURED CATFISH PRODUCTION

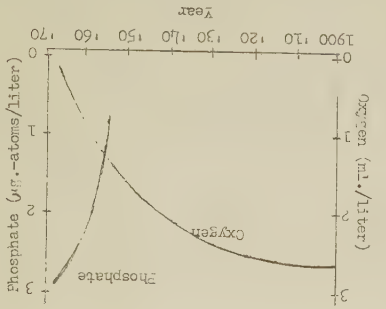
Anonymous
Published by the Darragh Company, P.O. Box 86, Little Rock, Arkansas, 17 pp. (n.d.) Free.

This industrial brochure describes very briefly, and in layman's language, the pond culture of catfish. The various pertinent sections cover water impoundments, holding ponds, growing ponds, water supply, stocking, feeding rates in growing ponds, oxygen depletions, parasites and diseases, harvesting, and raceway and cage methods of culture. [illustrated] FTP

9.19

of Stockholm, that looks like the figure on the right. The phosphate now present there is the result of complete deoxygenation and the growth of sulphate-reducing bacteria in the water. Added to this condition is a well-established increased salinity in the deep water, which has forced the halocline to rise in the water column and has increased its stability so that oxygen exchange across this density discontinuity is restricted even further.

The decrease in oxygen content of the deep water may have a combination of sources: decreased oxygen supply in the inflowing waters; increased stability of the halocline; greater primary production in the surface layers (brought about by the build-up in pollution, which, in turn, increases the amount of oxidizable organic matter that falls into deeper waters), along with an increased oxygen demand in the deeper layers; and direct supplies of organic matter to deep water from sewage and industrial waste. Data on this last source show that the amount of phosphorus added to the Baltic by such pollutants as fertilizers and detergents is roughly equal to the amount discharged naturally by streams and water exchange. The report points out that basic information about the phosphorus balance in the sea is urgently needed so that natural and artificial variations can be assessed separately. [1 figure]



9.19

9.19 BOMB CARBON-14 IN DEEP SEA ORGANISMS
(9.12)

Williams, P. M. (Institute of Marine Resources), and J. A. McGowan (Scripps Institution of Oceanography, University of California, San Diego, La Jolla, California 92037) and M. Stuiver (Department of Geological Sciences and Zoology, University of Washington, Seattle 98105)
Nature 227, No. 5256, 375-376 (July 25, 1970)

The radiocarbon activity of the inorganic carbon in surface sea water reflects the input of carbon-14 into the atmosphere from tests of nuclear weapons. Incorporation of this carbon-14 throughout the marine food chain can be used to determine the rate of cycling of organic carbon from the euphotic zone into the deep sea and the bottom sediment. Examination of two samples of zooplankton collected on the surface and of six samples of bathypelagic fish and crustacea caught at depths ranging from 400 to 2,100 m. indicated that the radiocarbon activity of surface zooplankton is basically that of the surface carbonate and bicarbonate. It showed that biocarbon can in some instances flow rapidly downward from the euphotic zone into the realm of deep-dwelling organisms. In other instances, the low activities of bathypelagic specimens suggest that some food chain different from those previously reported may operate to provide certain organisms with a carbon source that is older than the surface biocarbon. [1 table, 9 references] LB

9.19

mends for sloppy practices in the past. It must clean up its operations and it must compensate others who have been hurt by its negligence."
[5 photographs]

9.19 POLLUTION PROBLEMS, RESOURCE POLICY, AND THE SCIENTIST
(9.2)

Eipper, Alfred W. (Cornell University, Ithaca, N.Y. 14850)

Science 169, No. 3940, 11-15 (July 3, 1970)

The author describes some of the prominent characteristics of modern water pollution problems and the resource management principles that must be recognized in dealing with them. He also discusses the implication of these problems and principles to the scientists' role in helping to preserve the quality of the environment. A recent case (a proposed power plant on Cayuga Lake, New York) is used to illustrate certain aspects of present-day resource management controversy. He suggests nine principles to guide our dealings with natural environments and the scientists' role in implementing them. These principles are: (1) decisions on management of a natural resource must be basically public ones; (2) the widest possible variety of applicable criteria should be used for estimating values and determining priorities--the cost effectiveness approach is inadequate; (3) free and open communication is essential; (4) impending pollution problems should be corrected before they start; (5) because everyone has the right to a high-quality environment, the "burden of proof" must be on the potential polluter, not on the public; (6) all of us must pay the cost; (7) each alternative to achieving a program objective (that involves a natural resource) must be thoroughly considered; (8) future use of the environment must be in the recycle context of perpetual renewal and reuse (not the old pattern of use and discard); and (9) we must practice means of preventing pollution.
[16 references]

9.19 INDUCED PHOTOLYSIS OF DDT

Miller, L. L., and R. S. Narang (Department of Chemistry, Colorado State University, Fort Collins 80521)

Science 169, No. 3943, 368-370 (July 24, 1970)

Use of solar energy may be a way to decompose halogenated pesticides in the environment. Unfortunately these compounds do not have an extinction coefficient high enough into the solar region to induce environmental degradition. Another approach is to induce the decomposition of chlorinated hydrocarbons with other compounds that do absorb light in the solar region. This paper reports on the dehalogenation of DDT [1,1,1-trichloro 2,2-bis(p-chlorophenyl)ethane] by photolysis of a mixture of the pesticide and certain aromatic amines.

Apparently, the reactions involve a transfer of a photoinduced charge from the amine to the halide. Tritolylaminium chloride was produced from the photolysis of tritolylamine and carbon tetrachloride. Photolysis of a mixture of DDT and diethylaniline at 3,100 Å yielded DDE [1,1-dichloro-2,2-bis(p-chlorophenyl) - ethylene], DDD [1,1-dichloro-2,2-bis(p-chlorophenyl)ethane], DDCO [p,p'-dichloro - benzophenone], and hydrogen chloride. Photolysis of DDT did not occur unless an inducer with a low ionization potential (such as diethylaniline) was present. The mixture of DDT and diethylaniline was stable in the dark.
[1 table, 14 references]

9.19 GELLED OIL MAY LIMIT SPILL EFFECTS

Frye, John

National Fisherman 51, No. 5, 24A (September 1970)

A new method of treating oil spills promises not only to save the oil but to protect fish and other marine life as well. The idea is to turn the oil into a floating jelly that stays together rather than spreading across the surface of the water in the familiar slick. Such a jelly may drift for days, regardless of storms or temperature changes, having no more effect on marine life than a piece of driftwood has. Eventually it can be picked up mechanically and hauled back to the refinery for reprocessing. The gelling system can be used to treat an entire cargo of either crude or fuel oil; it can be easily pumped into and mixed with the oil aboard ship.

Esso Research & Engineering Co., originator of the system, has produced both rapid and slow gelling agents. Both use oil-soluble organic reactants of low density and viscosity. When injected into the crude oil, the chemicals in the reactants form a polymer; the oil does not enter into the reaction--rather, it is gelled by physical entrapment on and within the matrix formed by the polymer chains. The rapid system involves an amino-isocyanate reaction. A slower gelation, in the range of 15 min. to 1 hr., is achieved by replacing one of the reactants with a similar chemical of different configuration; this system produces a stronger gel than the rapid system produces. The gel strength at 34° is not noticeably different from that at 100° F. A still slower system, with gelation time from one to several hours, gives a gel with five times the strength of
(over)

9.2 ECONOMIC STUDY OF THE SAN PEDRO WETFISH BOATS
(1.0114)(1.11)
(1.21)(1.24)

Perrin, William F.,(Bureau of Commercial Fisheries, Fishery-Oceanography Center, P.O. Box 271, La Jolla, California 92037) and Bruno G. Noetzel (Bureau of Commercial Fisheries, Division of Economic Research, 7338 Baltimore Avenue, College Park, Maryland 20740)

Fishery Industrial Research 6, No. 3, 105-138 (August 1970)

The San Pedro wetfish-boat fleet has dwindled to half its size of 10 years ago. Wetfish, as defined here, are jack mackerel, Pacific mackerel, Pacific sardine, bonito, and northern anchovy. Large underused stocks of jack mackerel and anchovies exist in the California Current region. If these resources are to be harvested, the wetfish fleet must expand through the construction of new vessels or through the acquisition of surplus vessels from other fisheries. The purposes of the present study were to describe and document the financial condition of the fleet, to develop a model of wetfish-boat costs and earnings, and by means of this model, to examine the economic feasibility of fleet expansion and vessel replacement.

The findings of the study were that the fleet is antiquated, corporate profits are low, corporate net worth is low, working capital is inadequate, crew earnings are very low and are not increasing in pace with inflation, and employment in the fleet has decreased by 30 percent in the last 5 years.
(over)

9.19

that given by the moderate-speed process. In a pilot test of this system, 800 gal. of crude oil was gelled with 3% by weight of the gelling agent, injected directly and mixed with an airspray to simulate shipboard mixing conditions. A gel strong enough to support a brick that was placed on the surface formed in several hours. After 5 weeks, the gel was still intact.

The gelling agents do not react with sea water. Samples of gelled oil that have been submerged for several months showed no significant change; thus if a ship transporting oil should sink, the oil would not be released with time.

The system does have disadvantages. It costs about $4 to gel a barrel of oil. Carrying enough of the gelling agent to treat a whole cargo would cut down appreciably on the paying cargo that a tanker could carry. [Oil company officials have stated that six 250,000-ton (dead weight) ice-breaker tankers will be needed by 1975 to move oil from the Alaskan oil fields. Some 1,875,000 gal. of the gelling agent would be needed to treat all the oil in such vessels.] In most cases, neither the gelling agent nor the equipment would ever be required. The manufacturers are considering a plan whereby gelling agents and distribution equipment would be stockpiled at strategic locations. Following serious collision or grounding, the oil that constitutes the initial spill (some of which is retained on top of the water) would be gelled to prevent further spillage. The oil in compartments that might be ruptured by wave or tidal action or by salvage or demolition attempts could then be immobilized, not only giving more time for planning of the recovery and off-loading operations but also minimizing the cost by selective gelling of the necessary compartments only. [1 photograph]

9.2

Analysis of costs in several categories yielded equations to be used in predicting earnings at various levels of revenue and with various combinations of vessel size and composition of the catch. Their use showed that, of the four principal wetfish species, mackerel cost the least to land (per unit of value), anchovies and tuna cost about the same (more than mackerel) to land, and bonito cost the most to land.

Predicted crew earnings, profit, and return on investment based on the relations developed in the analysis of costs showed that although the expansion of the fleet through recruitment of existing vessels from other fisheries is feasible, fleet expansion or vessel replacement through construction of new vessels is not economically feasible at present rates of catch and prices of fish.
[11 figures, 24 tables, 23 references]

9.12 BEHAVIOUR OF LOBSTERS EXPOSED TO BLEACHED KRAFT MILL EFFLUENT (9.19)

McLeese, D. W. (Fisheries Research Board of Canada Biological Station, St. Andrews, New Brunswick)
Journal of the Fisheries Research Board of Canada 27, No. 4, 731-736 (April 1970)

Under laboratory test conditions, lobsters did not avoid bleached kraft mill effluent at concentrations of 20%. The effluent or fresh water introduced 50 cm. upstream from resting lobsters did not cause a behavioral response from the lobsters. The lobsters may have detected acetic acid and NH_4OH (two of six malodorous materials tested) but did not avoid them. The author concludes that exposure of lobsters to dilute solutions of bleached kraft mill effluent in nature would probably not have immediate, direct effects on the movement of lobsters.
[2 figures, 1 table, 9 references] FTP

9.19 METHYL MERCURY

Abelson, Philip H. (Editorial Office, Science, 1515 Massachusetts Avenue, Washington, D.C. 20005)
Science 169, No. 3942, 237 (July 17, 1970)

This article discusses the pollution problem related to the production and use of mercury compounds. It also briefly describes some of the steps in the accumulation of methyl mercury in fishes [Jensen, S., and A. Jernelöv, "Biological Methylation of Mercury in Aquatic Organisms," Nature 223, 753 (1969)].

Industrial wastes containing inorganic mercury compounds or phenyl mercury may find their way into the bottom muds of lakes. These compounds are converted into CH_3Hg^+ or $(CH_3)_2Hg$ by anaerobic organisms. $(CH_3)_2Hg$ is volatile and passes into the water column from the sediment. It is converted to Ch_3Hg^+ at low pH. The ion is soluble in water and is concentrated by living organisms of the lakes, usually appearing in the body lipids of the animals. The concentration in the fishes may, in part, come by way of the food chain, but apparently fishes may accumulate the ion directly. The concentration factor from water to pike fish is in the order of 3,000 or higher.
[2 references] FTP

9.19 EFFECT OF BIOLOGICALLY PURIFIED WASTE WATERS OF THE PAPER AND PULP INDUSTRY ON FISH

Podoba, Z. P. (U.S.S.R.)
Chemical Abstracts 72, No. 18, 93210t (May 4, 1970)

9.13 POSSIBLE SELECTIVE MECHANISMS IN THE DEVELOPMENT OF INSECTICIDE-RESISTANT FISH (9.19)

Finley, Mack T., Denzel E. Ferguson, J. Larry Ludke (Dep. of Zool., Mississippi State Univ., State College, Mississippi)
Chemical Abstracts 73, No. 1, 296lv (July 6, 1970)

9.19 ORGANOCHLORIDE PESTICIDES IN FUR SEALS (1.951)

Anas, Raymond E., Alfred J. Wilson, Jr. (Mar. Mammal Biol. Lab., Bureau of Commercial Fisheries, Seattle, Washington)
Chemical Abstracts 73, No. 1, 2958z (July 6, 1970)

9.19 AGRICULTURAL PEST CONTROL AND THE ENVIRONMENT

Irving, George W., Jr. (Agricultural Research Service, U.S. Department of Agriculture, Washington, D.C. 20250)
Science 169, No. 3938, 1419-1424 (June 19, 1970)

The control of agricultural pests and the protection of our environment from pollution create conflicting problems. Because agriculture must maintain and increase the efficiency of production to feed the increasing millions of people and animals in the world, continuing and even more effective control of pests is required. We can afford no longer to give up a substantial portion of our potential food supply to pests and crop diseases. At the same time as populations increase and people must move closer together, protection of the environment becomes more acute. We must have an effective program for protecting our food supply but at the same time preserve the quality of the environment.
[22 references] FTP

9.2 COSTS AND EARNINGS IN THE BOSTON LARGE-TRAWLER FLEET
(2.1121)

Noetzel, Bruno G. (U.S. Bureau of Commercial Fisheries, Division of Economic Research); and Virgil J. Norton (Department of Resource Economics, University of Rhode Island, Kingston)
Agricultural Experiment Station, University of Rhode Island, Bulletin 400, No. 8, 49 pp. (1969)

This bulletin reports on the economic performance of the large-trawler fleet that is based in Boston, Massachusetts, and fishes for haddock on Georges Bank. The analysis covers the 10 years from 1957 to 1966--the period just prior to the serious decline of this domestic industry. This particular fleet is composed of 22 otter trawlers of over 150 gross tons each.

The fishing effectiveness of the particular group of Boston trawlers (side trawlers of over 150 gross tonnage) increases directly with the size and horsepower of the vessel. (Fishing effectiveness is defined as the quantity of fish landed per day at sea.) Assuming a 50% construction subsidy, a 17% rate of return on investment may be expected on a trawler of the largest size as compared with a 6% rate on the smallest vessel within the specified category. Apparently, some vessels in this particular fleet can be operated with reasonable returns to capital and labor (that is, vessels of 230-300 gross tonnage, with engines of 700-900 hp., and with a crew of 17 men). The study showed, also, that a new large otter trawler (as described) built without any construction subsidy could

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9.3 NEW FOODS AND THE IMITATION PROVISIONS OF THE FOOD, DRUG AND COSMETIC ACT

Cody, William F. (CPC International, Inc., Englewood Cliffs, New Jersey)
Food·Drug·Cosmetic Law Journal 25, No. 5, 220-237 (May 1970)

The food industry has introduced various food products that are modified, technologically and nutritionally, to correct dietary problems without significant changes being made in the regular dietary patterns. The author discusses the regulatory problems encountered with such products. His hypothesis is that the food industry has made significant progress in its efforts to ameliorate certain dietary problems (for example, obesity and coronary heart disease), but that the policies of the U.S. Food and Drug Administration have delayed, and even harassed, these efforts. For the purpose of this report, the author selected two products for discussion (1) margarine and (2) a dehydrated egg which has been processed or adjusted to remove or minimize saturated fat or cholesterol, without reducing any important nutritive values or organoleptic characteristic of the egg.

The regulatory problem these two products have encountered is the "imitation" provisions of the Food, Drug, and Cosmetics Act. Pertinent sections of the act provide that a food that is an imitation of another food product is misbranded unless "imitation" is prominently designated on its label, and that a food that purports to be, or is represented as, a food which has been standardized, is misbranded if it does not comply with the standard.

The author believes that the problem could be solved in two ways. The first, the ideal solution, would be an administrative interpretation, or policy statement, by the Food and Drug Administration that such products (as those mentioned

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9.4 CONGRESS AND THE ENVIRONMENT
(9.17)(9.6)

Cooley, Richard A. and Geoffrey Wandesforde-Smith (University of Washington, Seattle, Washington (eds.)
University of Washington Press, Seattle, Washington (1970) 277 pp.

This book consists of a series of original case studies. Each chapter surveys a recent piece of legislation to determine how congress handles the particular environmental problem. Some pertinent issues involved are: meeting the costs of a quality environment, water quality, international control of the ocean floor, and national policy for the environment.

In Chapter 15, "Conclusions: Congress and the Environment of the Future," the editors state that the central problem raised by the essays in this book is whether or not the American political system can deal effectively with both a wide range of specific environmental issues and with the larger challenge of providing the nation with a meaningful public policy for the environment as a whole. They feel that our legislative body has failed to do more than make halting progress through a series of incremental adjustments.
[16 chapters, 6 figures, bibliography, index]

9.4 ANNOTATED ACRONYMS AND ABBREVIATIONS OF MARINE SCIENCE RELATED INTERNATIONAL ORGANIZATIONS

North, Jeanette P.
Rept. No. NODC-Pub-G-18, 130 pp. (1969) (National Oceanographic Data Center, Washington, D.C.
U.S. Government Research & Development Reports 70, No. 12, 25 (June 25, 1970) Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. AD-704 940, Price $3.00.

Only international organizations are included. The alphabetical order is based on the acronym/abbreviation. The text supplies the date of establishment or founding, briefly the aims or objectives of the organization or project, its membership, any literature published and, where possible, the current mailing address of each.

9.10 FISH BEHAVIOR

Protasov, V.
Trans. of Rybovodstvo i Rybolovstvo (USSR) 13, No. 2, 22-25 (March-April 1970)
U.S. Government Research & Development Reports 70, No. 14, 43 (July 25, 1970)
Available from the Clearinghouse for Federal Scientific and Technical Information, U.S. Department of Commerce, Springfield, Virginia 22151. JPRS-50597. Price $3.00.

Contents: What is behavior; Why do visual lures attract fishes; How fishes communicate with one another. Reprinted

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9.4 DECADE FOR OCEAN ESCALATION

Loftas, Tony
New Scientist 47, No. 708, 31-33 (July 2, 1970)

This article (by the author of The Last Resource: Man's Exploitation of the Sea) explores the problems facing the Paeem in Maribus convocation held in Malta in July. The members of the convocation are drawn from the public and the private sector, from national and international enterprises engaged in the extraction of living and nonliving resources from the sea, from diplomatic and other governmental agencies, and from intergovernmental organizations and agencies. They will be concerned with problems in four principal areas: legal-political matters and arms control, extraction of nonliving resources from the sea, development of living resources, and ocean sciences and ocean-science policy. Overlying all these concerns is the increasing military incursions into ocean space and the conflicts they generate among other interested users of ocean resources and amenities.

[2 photographs] LB

9.6 INFORMATION STORAGE AND RETRIEVAL SYSTEMS FOR INDIVIDUAL RESEARCHERS

Jahoda, Gerald
Wiley-Interscience (John Wiley & Sons Ltd., Baffins Lane, Chichester, Sussex, England), 135 pp. (n.d.) 84s
Reviewed by Anthony Pickford
New Scientist 47, No. 710, 151 (July 16, 1970)

This book gives the information a researcher needs to decide whether or not he should index his personal document collection and what kinds of index are suitable for particular circumstances. Enough technical details about indexing techniques are given to enable him to run the index properly and profitably once it is started. The book has a small list of well-chosen references to further information in the field. LB

9.6 OECD CATALOGUE OF PUBLICATIONS
(9.4)

Anonymous
Published by the Organization for Economic Co-Operation and Development, 2 rue André-Pascal, 75 Paris 16e, France (January 1970), 96 pp. Available OECD, Publications Center, 1750 Pennsylvania Avenue, N.W., Washington, D.C. 20006 Free.

This document lists the OECD publications on sale as of January 1, 1970. It covers publications in Economics, International Trade and Payments, Statistics, Agriculture-Food-Fisheries, Energy, Industry-Transport-Tourism, Manpower and Social Affairs, and Science and Education. FTP

9.3 THE PERSISTENT PROBLEM OF THE PERSISTENT PESTICIDES:
(9.17)(9.19) A LESSON IN ENVIRONMENTAL LAW

Rodgers, William H., Jr., (University of Washington, Seattle, Washington)
Columbia Law Review 70, No. 4, 567-611 (April 1970)

This paper is an interpretation and criticism of the conclusions of the report of the U.S. Department of Health, Education and Welfare, The Secretary's Commission on Pesticides and Their Relationship to Environmental Health (1969), with special emphasis on the treatment and relevance of the DDT issue.

Modern man is living in a new kind of environment largely created in a very short time of about 20 years. During this period, at least half a million new chemical compounds have come into existence. The issue is not whether the chemical control of pests has been useful--technology in agriculture is the key to our way of life. The innovations must serve the ends of civilization rather than subvert them--the story of DDT, the author states, is a story of uncontrolled experimentation with the worlds' population and environment. He states further that the vehicle for protecting us from ourselves--the law--has been tried and found wanting. Whether that vehicle will be repaired for the voyage into the future is currently being debated.

[267 footnotes] FTP

9.2

not be operated efficiently enough to secure a rate of return that would attract new capital. Even the vessels with the highest rate of return on investment would return only about 6% of the invested capital (no construction subsidy condition).

[14 figures, 18 tables, appendix]

9.3 THE LAW OF THE SEA. NATIONAL POLICY RECOMMENDATIONS

Alexander, Lewis M.
Technical Rept. 31 March-69-31 March 70, Rhode Island Univ. Kingston Law of the Sea Inst., 542 pp. (April 1970)
Available from the Law of the Sea Inst. Univ. of Rhode Island, Kingston, R.I., price $7.50 (paper copy).
U.S. Government Research & Development Reports 70, No. 14, 27 (July 25, 1970)

The volume contains nineteen professional papers, critiques of several of these, shorter articles by panel participants, and verbatim discussions covering the four-day conference. The program centered primarily about the international policy recommendations of the Marine Science Commission, and was broken down into the following major sub-headings: the deep-seabed and continental shelf; fisheries arrangements; and freedom of scientific inquiry. There were also sessions on offshore boundaries and boundary determination, and on ocean strategy for the United States. Among the contributed papers in the volume are one on the Malta Plan and the United Nations, and another on Mathematical Economics and Marine Resources Research. (Author)

9.3

above) do not purport to be, and are not represented as, the standard or traditional article. The second way would be the promulgation of standards of identity for these special-purpose foods.

[46 footnotes]

0.116 CHARGE-MOSIAC MEMBRANES: DIALYTIC SEPARATION OF ELECTROLYTES FROM NONELECTROLYTES AND AMINO ACIDS

Weinstein, John N., and S. Roy Caplan (Biophysical Laboratory, Harvard Medical School, Boston, Massachusetts 02115)
Science 169, No. 3942, 296-298 (July 17, 1970)

Dialytic separations of potassium chloride from low-molecular-weight nonelectrolytes and neutral amino acids (methanol, urea, glycine, L-phenylalanine, and D-mannitol) were made by use of charge-mosaic membranes. A charge-mosaic membrane is a set of cation and anion exchange elements arranged in parallel; each element constitutes a continuous pathway from one bathing solution to another. The authors suggest the application of charge-mosaic membranes for laboratory separations, industrial processing, and hemodialysis.
[2 figures, 1 table, 8 references] FTP

0.113 IMPROVEMENTS IN OR RELATING TO MICROWAVE HEATING DEVICES

British Patent 1,196,437
Litton Industries Inc. (U.S.A.) (pat.)
BFMIRA Abstracts 23, No. 8, Abstract No. 1763, 431 (August 1970)

A more uniform heat distribution within the resonant cavity of a microwave heating device is obtained without the use of moving elements. This is achieved by the use of two irises, one which couples E-field energy and the other which couples H-field energy for introduction into the resonant cavity. Reprinted

0.9 LEADERSHIP STYLE, CONFIDENCE IN MANAGEMENT, AND JOB SATISFACTION

Sadler, Philip J. (Ashridge Management College, Berkhamsted, Hertfordshire, England)
Journal of Applied Behavioral Science 6, No. 1, 3-19 (January-February-March 1970)

The study indicates that four descriptions of leadership styles are meaningful to people (the "tells," "sells," "consults," and "joins" styles). The consultive style was most consistently preferred. Most people could see their own managers as fitting one of the four descriptions. Those people who felt that their managers did not fit any of the descriptions had the least confidence in management and had relatively low job satisfaction.

The most significant conclusion is that leaders who have a distinct and identifiable style are more effective in promoting employee confidence and satisfaction, whatever style they adopt, than do those who do not have a distinctive style. One important characteristic of a leader, therefore, is consistency of behavior. The work provided additional support for the widely held view of the superiority of the consultative style of leadership. [5 references] FTP

0.7 THE INFLUENCE OF HEATING ON THE NUTRITIVE VALUE OF MEAT PROTEINS (2.8)

Hofmann, K.
Meat Ind. Rev., Yugoslavia 2, No. 1, 43-47 (1970) (In German)
BFMIRA Abstracts 23, No. 8, Abstract No. 1597, 393 (August 1970)

A table is given on the effect of various heat treatments (boiling, roasting, canning, autoclaving) on certain amino acids and on the nutritional value of meat proteins. Reprinted

0.4 OZONE AND VITAMIN E

Goldstein, Bernard D. (Department of Medicine, New York University Medical Center, Goldwater Memorial Hospital, New York 10017), Ramon D. Buckley, Ramon Cardenas, and Oscar J. Balchum (Departments of Medicine and Biochemistry, University of Southern California, School of Medicine, Los Angeles 90033)
Science 169, No. 3945, 605-606 (August 7, 1970)

The authors suggest that an important cause of ozone toxicity is the peroxidation of unsaturated fatty acids. According to this theory, then, a deficiency of vitamin E (antioxidant) would render animals more susceptible to ozone toxicity; furthermore, exposure of animals to ozone would be expected to lead to a more rapid utilization of this antioxidant. The purpose of this study was to test these suppositions.

Vitamin E deficient rats were exposed to sublethal levels of ozone. Such exposure of the rats produced an accelerated decline in serum vitamin E levels. The findings, therefore, support the possibility that ozone results in lipid peroxidation. [1 table, 19 references] FTP

2.111 SCRABSTER [SCOTLAND] BOATS USE NEW STEEL BRIDLE

Anonymous
Fishing News, No. 2975, 9 (June 19, 1970)

A new bridle, measuring 2 ft. 4 in. by 2 ft. 7 in. and made in the form of an egg-shaped ½-in. mild-steel bar, acts as a spacer between the sole rope and the net headline. When properly rigged, it prevents either rope from twisting. It will not rip the net (as a weighted pole will) when the net has become fast and the boat must backtrack to free the net. Nor will it break easily when it is caught on the bottom; rather, its shape allows it to skim along over rough ground. The manufacturer (Maxwell Brahms & Son, 16 Rotterdam Street, Thurso, Caithness, Scotland) says that fishermen using the bridle have saved its initial cost many times over because they lose fewer nets. No price is given in the article. LB

2.12 SEARCHING THE SHRIMP BEDS BY SUB (2.117)

Anderson, William W., and Harvey R. Bullis, Jr. (U.S. Bureau of Commercial Fisheries)
Sea Frontiers 16, No. 2, 112-119 (March-April 1970)

The research submarine Alumiaut and its exploration of the fishing grounds off the east coast of Florida are described.
[4 photographs] LB

Subject	Page No.	Code No.
ANALYSIS, GENERAL		
The Principles of Conformational Analysis	15	7.1
Recognition of Bunker Oils by Thin-Layer Chromatography	15	7.9
ANALYSIS, INORGANIC		
Comparative Analysis of Variance of---Nitrogen Technique[s]	16	7.44
ANALYSIS, MOISTURE		
Trace Element Determination by Neutron Activation Analysis	16	7.42
ANALYSIS, ORGANIC		
Determination of Formaldehyde in Foods	16	7.597
The Determination of Organic Peroxides	16	7.872
APPARATUS AND EQUIPMENT		
New Thoughts on an Old Subject -- Cold Storage Insulation	9	3.231
Patent Abstracts		
Moisture Control (pat.)	9	3.231
Refrigerators for Food (pat.)	9	3.231
Removing Gases (pat.)	9	3.231
Expanding a Gas (pat.)	10	3.231
Insulating Element (pat.)	10	3.231
Refrigeration System (pat.)	10	3.231
Improvements in or Relating to Microwave Heating Devices (pat.)	25	0.113
Charge-Mosaic Membranes:...Separation of Electrolytes From...Amino Acids	25	0.116
AUTHOR INDEX	28	
BACTERIOLOGY		
Detection of Clostridium botulinum...I...in Smoked Fish	1	0.5
Survival of Virus in Chilled, Frozen, and Processed Oysters	1	0.5
Bacterial Spore Outgrowth: Its Regulation	2	0.5
...Escherichia coli on Storage Pen Surfaces of Fishing Trawlers	2	0.5
Halophilic Bacteria	2	0.5
BIOCHEMISTRY AND METABOLISM OF FISH		
Possible Selective Mechanisms in...Insecticide-Resistant Fish	22	9.13
BYPRODUCTS, MISCELLANEOUS		
Margarine Compositions (pat.)	14	6.54
New Starter for Sausage	14	6.54
CANNED FISH, PROCESSING		
Part II...Moisture Losses in Fresh and Frozen Herring	11	3.332
Prevention of Off-Flavors in Foods (pat.)	12	3.3341
CHEMISTRY AND BIOCHEMISTRY		
Cyclic Adenosine Monophosphate in Bacteria	1	0.38
Specificities of Transport Systems and Enzymes	1	0.38
Stable Carbonium Ions in Solution	2	0.3
Electrical Conductivity of Solutions of Slime...of Freshwater Fish	2	0.34
Postmortem Breakdown of Trimethylamine Oxide in Fish...	2	0.36
Horseshoe Crab Lactate Dehydrogenases: Evidence for Dimeric Structure	2	0.38
COMPOSITION, ORGANIC		
Chemical Composition of Atlantic and Gulf Menhaden Fish Solubles	13	6.15
CONSERVATION		
Thinking Planet-Wise	19	9.17
Diversion and Collection of Juvenile Fish With Traveling Screens	20	9.17
Congress and the Environment	23	9.4
COOKERY		
...Controlling the Curling of a Peeled Shrimp During...Cooking... (pat.)	8	2.8
Microwave Heating Apparatus (pat.)	8	2.8
DISEASES AND POISONS OF FISH		
Retention of Chromium-51,...Iodine-131 by the Atlantic Croaker...	17	9.15
DRIED AND DEHYDRATED FISH		
Dehydration Process (pat.)	12	3.63
ECONOMICS AND STATISTICS		
Economic Study of the San Pedro Wetfish Boats	21	9.2
Costs and Earnings in the Boston Large-Trawler Fleet	23	9.2
EUROPEAN FISHERIES, MISCELLANEOUS		
The Herring of the North Atlantic Basin...and...Its Distribution	3	1.22
FOOD TECHNOLOGY		
Commercial Developments of Intermediate Moisture Foods	3	0.6
Development of Intermediate Moisture Foods for Military Use	3	0.6
IFT Report, Part 1: Ralph Nader, Magnus Pyke, Ethics and Research	3	0.6
...[List of SIK...Publications, 1948 - 1969]	4	0.6
FRESHNESS OF FISH		
...Adenosine Triphosphate in Frozen Fish and Freshness	16	7.879
FROZEN FISH, PROCESSING		
Freeze Drying (pat.)	10	3.2349
New Freeze-Drying Method	10	3.2349
The Uniformly Retreating Ice Front Model	11	3.2345
Method of Freezing Foodstuffs (pat.)	12	3.234
Freezing Process (pat.)	12	3.2342
GEAR, FISHING		
Lobster Trap Tests Reveal Need for Cheap, Long-Lasting Material	5	2.1128
Pacific Seiners Cut Labour Costs With Power Net Drum	6	2.1125
Scrabster [Scotland] Boats Use New Steel Bridle	25	2.111
HANDLING FRESH FISH		
Microwave Heating (pat.)	6	2.3
Shrimp Cooking (pat.)	6	2.3
Tenderizing Apparatus (pat.)	6	2.3
MARINE PLANT PRODUCTS		
Agar-Agar Product (pat.)	14	6.33
Manufacture of Agars in Gifu Prefecture. XXXII...	14	6.33
Algin Coating Removal (pat.)	14	6.34
MARKETING		
Display Case (pat.)	12	3.26
NEW PRODUCTS		
Fish Paste Product (pat.)	4	2.06
Fish Protein Product (pat.)	4	2.06
NORTH AMERICAN, U.S. FISHERIES, MIDDLE AND SOUTH ATLANTIC		
The Atlantic Surf Clam Fishery (1968)	6	1.82
NUTRITION AND MEDICINE, GENERAL		
Nutritional Improvement and World Health Potential	4	0.7
The Possible Nitrosation of Amines in Smoked Chub	7	2.9
Ozone and Vitamin E	25	0.4
The Influence of Heating on the Nutritive Value of Meat Proteins	25	0.7
NUTRITIONAL VALUE OF FISHERY BYPRODUCTS OTHER THAN MEAL		
Catfish Byproducts	13	6.50
OCEANOGRAPHY		
Submersibles	16	9.11
Diver Performance in Cold Water	17	9.11
Future Prospects for Physical Oceanography	17	9.11
Carbon-13 in Black Sea Waters and...the Origin of Hydrogen Sulfide	18	9.11
...Carbon Monoxide and Gaseous Hydrocarbons in Seawater:...	18	9.11
OILS, UTILIZATION AND MARKETING		
Fats and Oils in Canada. Annual Review 1969	11	4.7
PACKAGING		
Clam Packaging (pat.)	8	2.43
Frozen Seafood Packaging System Opening Inaccessible Markets	11	3.2387
Insulated Containers (pat.)	12	3.2387
PARASITES AND PREDATORS OF FISH		
Acanthaster planci (Crown of Thorns Starfish) and the Great Barrier Reef	17	9.15
PERIODICALS AND BOOKS		
OECD Catalogue of Publications	24	9.6
POLLUTION		
International Concern About the Baltic Sea	19	9.19
Mercury Pollution: Fisheries Department Acts Quickly...	19	9.19
Bomb Carbon-14 in Deep Sea Organisms	20	9.19
Gelled Oil May Limit Spill Effects	21	9.19
Induced Photolysis of DDT	21	9.19
Pollution Problems, Resource Policy, and the Scientist	21	9.19

EXPLORATORY FISHING
Searching the Shrimp Beds by Sub 25 2.12
FISH CULTURE
Seed Mollusc Production 17 9.16
New Publication on Marine Aquaculture 18 9.16
Thermal Variation Dangers in Aquatic Transfer Process 18 9.16
Fish Farm Enclosures.
2--Wave Forces and Currents 19 9.16
6--Impermeable Barrier Construction 20 9.16
Cultured Catfish Production 20 9.16
FISH MEAL AND OIL, MANUFACTURE
Feasibility of Using Tennessee River Fish for Fishery Products 13 6.130
Oil Deodorization (pat.) 14 6.135
Oil Deodorization (pat.) 14 6.135
FISH PROTEIN CONCENTRATE
The Fish Protein Concentrate Story...Nutritional Quality and Use... 13 6.54
FISHERY BIOLOGY AND ICHTHYOLOGY
Marine Biology. An Introduction to Its Problems and Results 16 9.1
Behaviour of Lobsters Exposed to Bleached Kraft Mill Effluent 22 9.12
Fish Behavior 24 9.10
FISHERY EDUCATION
Information Storage and Retrieval Systems for Individual Researchers 24 9.6
Leadership Style, Confidence in Management, and Job Satisfaction 25 0.9
FISHING CONCERNS AND AGENCIES
...Acronyms and Abbreviations of...International Organizations 23 9.4
Decade for Ocean Escalation 24 9.4
FISHING METHODS
Sea Temperature Maps Aid Tuna Fishermen 5 2.141
Fish Finding With Sonar. Part Six--Reverberation;... 7 2.146
N. Zealand Explores a Tuna Catch Technique 7 2.147
POLLUTION--Continued
Agricultural Pest Control and the Environment 22 9.19
Effect of Biologically Purified Waste Waters...on Fish 22 9.19
Methyl Mercury 22 9.19
Organochloride Pesticides in Fur Seals 22 9.19
PRESERVATION, IRRADIATION
[Radiation Chemistry] 9 3.15
Commercial Feasibility of Irradiating Haddock and Cod Fillets
1. Quality of Haddock as Landed at Boston, Massachusetts 9 3.15
2. Temperature Patterns During Shipments of Fresh Fillets... 10 3.15
Effect of γ-Radiation on the Amino Acid Composition of...Fish 10 3.15
QUALITY CONTROL
...Determining Commercial Sterility of Low-Acid Canned Foods 15 7.86
Manufacturing Requirements of Food for Aerospace Feeding 15 8.7
REGULATION AND INSPECTION
New Foods and the Imitation Provisions of the Food, Drug and Cosmetic Act 23 9.3
The Law of the Sea. National Policy Recommendations 24 9.3
...Persistent Pesticides: A Lesson in Environmental Law 24 9.3
SPOILAGE
Chronopotentiometric Study of Formaldehyde in Fish Flesh 4 2.03
TOXICITY
Mercury in Freshwater Fish 7 2.9
Chemistry of Some Toxins Isolated From Marine Organisms 8 2.9
TRANSPORTATION
Refrigeration Outdoors (Pat.) 12 3.25
Reversible Cooler (pat.) 12 3.25
VESSELS, FISHING
Barnacle Cement--Key to Second Generation Antifouling Coatings 5 2.113
GDR Flotilla Fishing 5 2.117
Purpose-Built Cockle Dredger 6 2.117

Author	Page	Code
Abelson, Philip H.	22	9.19
Ackman, R. G.	15	7.9
Addison, R. F.	15	7.9
Alekseev, O. L.	2	0.34
Alexander, Lewis M.	24	9.3
Allen, Kenneth O.	18	9.16
Ambrose, M. E.	13	6.15
Anas, Raymond E.	22	9.19
Anderson, William W.	25	2.12
Avery, Max	7	2.147
Baker, J. S.	14	6.135
Balchum, Oscar J.	25	0.4
Baptist, J. P.	17	9.15
Barton, D. H. R.	15	7.1
Bates, Daniel W.	20	9.17
Bennett, R. A. (pat.)	8	2.43
Berlin, Richard D.	1	0.38
Biino, Luciano	4	2.03
Bleile, Henry R.	5	2.113
Bligh, E. G.	7	2.9
Borgi, Giovanni (pat.)	9	3.231
Bowbeer, Arthur	17	9.16
Brebant, R.	14	6.135
Brewster, M. L. (pat.)	10	3.2349
Brockmann, Maxwell C.	3	0.6
Buckley, Ramon D.	25	0.4
Bullis, Harvey R., Jr.	25	2.12
Bustead, Ronald L.	15	8.7
Caplan, S. Roy	25	0.116
Cardenas, Ramon	25	0.4
Carlson, Clarence J.	11	3.332
Cody, William F.	23	9.3
Cooley, Richard A.	23	9.4
Darling, Frank Fraser	19	9.17
Dear, B. D.	16	7.42
Denbsky, G.	16	7.597
Denny, C. B.	15	7.86
Deuser, W. G.	18	9.11
DiGirolamo, R.	1	0.5
Dooley, Carol A.	5	2.113
Doty, W. H.	16	7.44
Earle, R. D. (pat.)	14	6.34
Edwards, J. B.	14	6.135
Eipper, Alfred W.	21	9.19
Ferguson, Denzel E.	22	9.13
Finley, Mack T.	22	9.13
Flentge, Robert L.	15	8.7
Friedrich, Hermann	16	9.1
Frye, John	21	9.19
Fujii, Yutaka	16	7.879
Godfrey, C. S.	6	2.3
Goldstein, Bernard D.	25	0.4
Gunn, R. D.	11	3.2345
Halvorson, H. O.	2	0.5
Hansen, J. N.	2	0.5
Hayashi, Kaneo	14	6.33
Hearnden, E. H.	19	9.19
Hice, H. B. (pat.)	8	2.8
Hiramitsu, Takeshi	14	6.33
Hofmann, K.	25	0.7
Hoss, D. E.	17	9.15
Irving, George W., Jr.	22	9.19
Jahoda, Gerald	24	9.6
Johnson, R. M.	16	7.872
Kaplow, Milton	3	0.6
Kautter, Donald A.	1	0.5
Kaylor, John D.	9	3.15
	10	3.15
Khotinskaya, V. D.	2	0.34
Kikuchi, Terukichi (pat.)	14	6.33
Knobl, G. M., Jr.	13	6.54
Krzeczkowski, Richard A.	13	6.130
Kushner, Donn J.	2	0.5
Lamontagne, R. A.	18	9.11
Lane, J. Perry	11	3.332
Levin, R. E.	2	0.5
Lewis, C. W.	17	9.15
Lilly, Timonthy, Jr.	1	0.5
Lindner, Elek	5	2.113
Liston, J.	1	0.5
Loftas, Tony	24	9.4
Ludke, J. Larry	22	9.13
Malins, Donald C.	7	2.9
Maslennikova, N. V.	10	3.15
Maslov, N. A.	3	1.22
Matches, J. R.	1	0.5
McGowan, J. A.	20	9.19
McLeese, D. W.	22	9.12
McNeil, William J. (ed.)	18	9.16
Mijnders, A.	14	6.54
Miller, David	13	6.15
Miller, L. L.	21	9.19
Milne, P. H.	19	9.16
	20	9.16
Mohler, K.	16	7.597
Morgan, D. G. (pat.)	12	3.63
Munson, A. W.	16	7.44
Murphy, Edward J.	9	3.15
	10	3.15
Nakamura, Takeshi	14	6.33
Narang, R. S.	21	9.19
Neff, Alfred (pat.)	6	2.3
Noetzel, Bruno G.	21	9.2
	23	9.2
North, Jeanette P.	23	9.4
Norton, Virgil J.	23	9.2
Olah, George A.	2	0.3
Ormond, Rupert (reviewer)	17	9.15
Pastan, Ira	1	0.38
Perlman, Robert	1	0.38
Perrin, William F.	21	9.2
Phillips, Glyn O. (reviewer)	9	3.15
Podoba, Z. P.	22	9.19
Pritzlaff, John A.	16	9.11
Protasov, V.	24	9.10
Robisch, Paul A.	7	2.9
Rodgers, William H., Jr.	24	9.3
Rosen, A.	2	0.5
Roubal, William T.	7	2.9
Sadler, Philip J.	25	0.9
Saroyan, John R.	5	2.113
Scheuer, Paul J.	8	2.9
Schneider, E. L.	16	7.44
Selander, Robert K.	2	0.38
Seward, R. M.	9	3.231
Siddiqi, I. W.	16	7.872
Sidwell, V. D.	13	6.54
Sipos, J. C.	15	7.9
Sixsmith, H.	10	3.231
Slack, E. B.	6	2.1125
Soares, J. H., Jr.	13	6.15
Spiegelman, G.	2	0.5
Spurling, Ted	5	2.1128
Stang, Paul R.	17	9.11
Stare, Fredrick J.	4	0.7
Stillings, B. R.	13	6.54
Stommel, Henry	17	9.11
Stuiver, M.	20	9.19
Swinnerton, J. W.	18	9.11
Veltman, P. L.	6	2.3
Wandesforde-Smith, Geoffrey (ed.)	23	9.4
Weinstein, John N.	25	0.116
Westenberg, H. W. L.	14	6.54
Wiener, Earl L.	17	9.11
Williams, P. M.	20	9.19
Wilson, Alfred J., Jr.	22	9.19
Wilson, D. F.	18	9.11
Wood, D. E.	16	7.44
Yamada, Kinjiro	2	0.36
Yancey, Robert M.	6	1.82
Yang, Suh Y.	2	0.38

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